



TEACHER

ADVICE BOOKLET



Everything you need to know about the Greenpower IET Goblin Kit Car Project, but were afraid to ask.

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GREENPOWER EDUCATION TRUST

So, you've either been approached by Greenpower or heard about Greenpower's amazing project from another source and would like to know more. This information booklet will help answer those questions that you may, or may not, have thought of from your initial introduction through to race day and beyond.

WHO ARE GREENPOWER AND WHAT DO THEY DO?

Greenpower Education Trust is a UK based charity that challenges young people to design, build and race an electric single seater racing car. The resulting engagement and enthusiasm results in excellent learning opportunities in science & engineering.

We supply age-appropriate Kit Cars, which can be built in school, college or elsewhere and raced at Greenpower organised events held

at motorsport venues all over the UK. The IET Goblin formula leads on to further challenges for 11 – 25-year-olds that can ultimately lead to them designing & building a complete car in line with Greenpower regulations. The Greenpower challenge uses the excitement of motorsport to inspire young people to excel in Science, Technology, Engineering and Maths (STEM).

We work with over 700 teams throughout the UK and hold 35+ regional events each year. These events culminate in the Gathering of Goblins and an International Final event for the senior classes.

More than 10,000 students take part each year, from primary school age through to university. A growing number of international teams participate in the Greenpower challenges with licensed Greenpower operations in the USA, China, India, Singapore, Malaysia and Poland.

IET FORMULA GOBLIN (PRIMARY SCHOOLS)



The IET Formula Goblin is an electric kit car, designed to give young people the opportunity to build and race their own car at venues like Goodwood and Silverstone, all over the UK from Cornwall in the south-west and up into Scotland. A typical build takes 15 hours, and the Goblin can be dismantled and rebuilt each year with a new team of children. The Goblin Kit Car is designed for 9- to 11-year-old children and is ideal for schools and community groups. The kit comes with easy-to-follow instructions and the build requires only simple hand tools. Schools can run the project as part of the design and technology or science curriculum, or as a lunch time, after school or weekend club – with parent support.

“If you find yourself in need of additional help this is available via a number of routes including our regional volunteer ambassadors, social media groups and email. Our ambassadors have a wealth of experience and enthusiasm for all things Greenpower and are only too pleased to be asked for assistance. Social media groups offer the chance to communicate with other Greenpower teams and the Greenpower staff are always happy to help whether it be how to resolve a problem you have encountered, identifying a spare part you require or giving guidance on attending events.”

If you're looking for a mentor to come and help on a regular basis why not see if there's a local STEM ambassador that would like to get involved with your project. They can be contacted via your local **STEMNET Hub**.

A number of UK Police Forces and Fire & Rescue Services have also been of great help to teams in the past so may be worth contacting.

Of course, there's much more to a Greenpower project than simply assembling the kit into a racing car. One essential item that is required for any kit to race, is the bodywork. This is not supplied as part of the kit as it is for the young people to create to their own design. This brings in both artistic design and materials selection to the project. Materials can be pretty much anything with many teams focusing on eco-friendly and/or recycled materials.

Once the build has been completed, driver training can normally take place in a school playground. The team will then be ready to attend a Greenpower event where they will get the opportunity to compete against each other and other teams in a series of driving challenges.



For all information regarding the Greenpower Education Trust go to our website:

<https://www.greenpower.co.uk>

Once on the site go to <https://www.greenpower.co.uk/start-team> to download the Goblin Guide, which is the Primary school race category. You will find a fantastic overview of the project, covering such things as:

- Kit car build
- Tools used
- Re-using the car
- Events and how to enter
- Race day with Generic Race timetable
- Risk assessment & Insurance
- Race Day Awards
- Funding
- Team Support
- How to Register online
- Costs of kit & How to Order a Kit Car



FUNDING THE KIT CAR

Schools approach funding the kit car project in a number of different ways such as funding from the school, Friends of the school, local companies helping with sponsorship, or raising funds through different school events. There are also local grant funding streams and even some banks will offer match funding. From time to time, we have grant funding available in specific areas to help teams to engage in the Greenpower challenge. Please keep checking <https://www.greenpower.co.uk/project-areas> to find out if there is any funding available in your area.

SETTING UP THE TEAM

Many teachers look for suggestions on how to approach the Greenpower Goblin Project within the classroom. Most schools will receive the kit, construct it, race it, then deconstruct it at the end of the race season, ready for the next team to construct it the following year. If you have the time, then this approach allows more learning opportunities for the class, compared with constructing the car, racing it and leaving it constructed, for the following year. There is, however, nothing wrong with the latter

approach, especially if there are time constraints or you only have a very small team, such as an after-school club or in a small number of cases a Saturday club, supported by parents and other volunteers. Nevertheless, a great deal of schools look to engage as many pupils in the project as possible, and if the next year group do not have the opportunity to construct the car, they are unlikely to benefit from the full learning opportunities available to them from the project.

The project is aimed at year 5/6 classes (9- to 11-year-olds), most schools like to have the year 6 class engaged as it acts as a welcome distraction from SATs. If you are looking at engaging the whole class, you will realise very quickly that having 20+ pupils all clambering to build the kit doesn't work.

When considering how many people can be involved remember that a team is more than just driver and pit crew! There are many roles to undertake in order for a team to be successful. We often suggest looking at the project as a "business", allocating the various functions to specific people.



Think of a Formula 1 Team and all the roles involved in their success and apply this to your Greenpower project. You may then have, for example, the following:

Finance Team, Fundraising Team, Marketing Team, Team Photographer, Car Build Team, Design Team, Pit Crew, Drivers and even Cheerleaders.

Once you have decided to join the Greenpower family and purchase a kit you might make a presentation to the students about Greenpower and what they can expect. Also, that the car has been purchased via a “business loan” and that funding will need to be raised to “pay the loan back”. As such the team will need to be run like a professional Formula 1 team. With different responsibilities as well as those of the drivers.

- **Finance team:** responsible for income and expenditure of all funds raised. Responsible for advising the team on the financial health of the project and linking with the fundraising team and marketing teams.
- **Fundraising team:** responsible for raising funds by creating events, such as cake sales, approaching sponsors, presenting to parents at an open/parents' evening to encourage financial, materials or in-kind support and help. Create a 'Dragons Den' type event with

local industry representatives as dragons and pupils pitching for financial support for such things as; the kit car, helmets, overalls, gloves, tools, transportation of vehicle to race event, materials for bodywork or even getting the car 'wrapped'. Companies may be happy to support your team with apprentices who can help with the build, or with financial support if you advertise this support on your team overalls for example. Some local banks also have match funding for particular projects, especially if it is all-inclusive. Also don't be afraid to contact your local colleges and universities as they will normally have staff, as well as funds, whose job role is to engage with schools, especially if it is linked to STEM. Many local parish, town or district councils offer grants for all sorts of projects so it is also worth contacting them to see if you may qualify.

- **Marketing Team:** Responsible for creating marketing material to be used for approaching sponsors, parents etc. Also creating presentations that could be used in school assemblies (pupils & parents) or on monitors within reception, to highlight the project and to show the build progress. Responsible for maybe setting up a team social media page, as well as talking to the local press. Also be responsible for advising the team photographer of what is required.

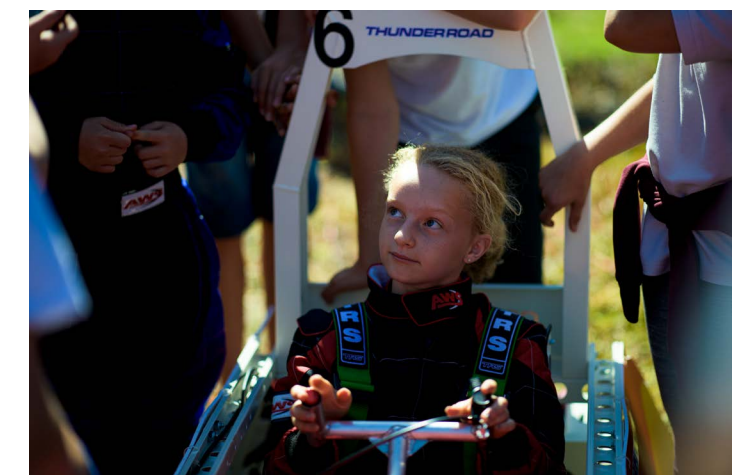
- **Team photographer:** Responsible for creating a photographic diary of the team's progress, such as the arrival of the kit car, team photograph, step by step photo diary of the build, photos of the test drive and driver selection, photos of the actual race day and car deconstruction. As well as photos you could also record the build via video or use a Go Pro camera, which could be attached to the car on race day, in order to create a race video to show in assembly or on the reception monitor. This photographic diary can be used as a race team portfolio for which there is a 'Best Portfolio Prize' at the race event. A portfolio is simply a way for your team to show off everything that you have learnt throughout your time on the Greenpower project. It is a record of your Greenpower journey and will explain how you designed, built, and raced your car. If you haven't raced yet, you can explain what you want to achieve when you do race.
- **Car Build Team:** Responsible for firstly checking that all parts have been delivered, as per parts list from Greenpower. To breakdown team into subgroups so that they are working in pairs on different aspects of the build, such as the frame, steering, electrics etc. When deconstructing the car, we suggest that this is done carefully and monitored by an adult. You must ensure all nuts, bolts and washers, are carefully packaged and labelled as this will stop any confusion when the next team start their build. Communicate with finance or the fundraisers with regards to what tools need to be purchased to construct the car.
- **Design Team:** Responsible for all aspects of design. This could be the race team logo, for the literature, on the car and race overalls. Also, the measuring of the bodywork, followed by the design and shape of the body panels (not supplied) and what materials you are going to use: plastics, cardboard, willow sticks, kit packaging material, aluminium, sheet metal, thin plywood, MDF, Corex, foamboard,

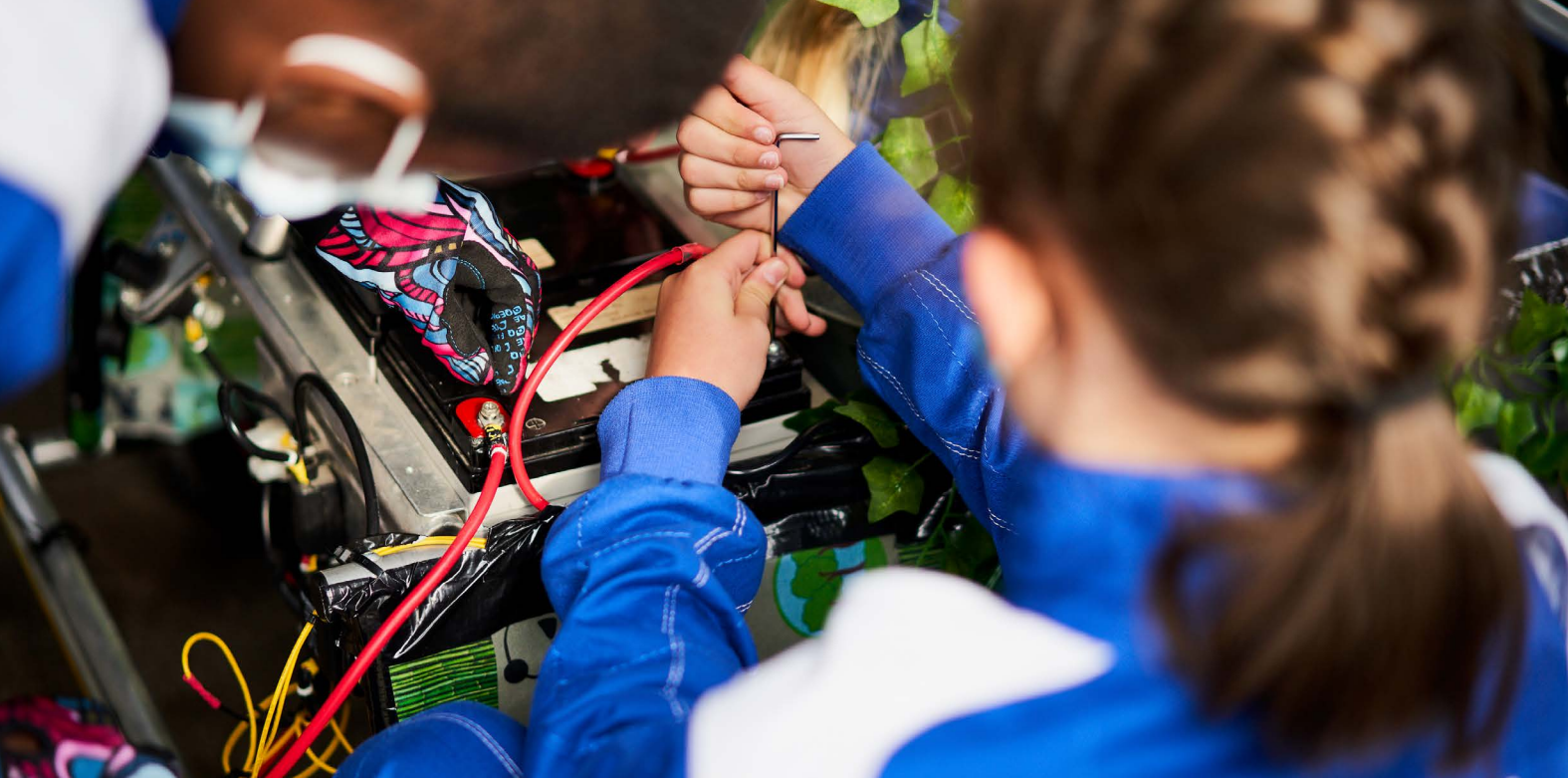
recycled materials that have been weaved. As long as the materials are safe, with no sharp edges and shatter proof you can use almost anything. The design on your panels can be anything from a typical race car design to a collage based around a particular topic such as sustainability or pollution.

- **Pit Crew (race day):** Responsible for prepping and maintain the car at the track. Ensuring the driver is fitted safely into the car prior to the race. Also acting as the start line pusher and retrieving the powered down car after each event by having one person pushing the car back to the assembly area.

Although the construction and driving of the car is aimed at years 5/6, this does not mean younger pupils cannot also be involved. You can engage younger pupils by asking them to help with the shape and design of the car or the artwork on the race panels or coming up with a race team name and race logo. Some schools will use the car as a way of engaging pupils in all aspects of sustainability. As the car is electric you can start looking at electric car technology, wind and solar power as well as wave power or even ground source heat pumps.

You may want to link the car to aspects of pollution whether this is air pollution or plastic pollution. So, some schools will create a topic around the car say, sea pollution, and create a collage on the side of the car, thus engaging younger pupils.





SCHOOL TEST DAY 'MUST DO'S'

Once the build has been completed the team will be keen to get on and drive the car. However, before causing carnage, we have to carry out safety checks. This is done by safety scrutineering your car before any driver gets into the car. This checklist can be accessed via www.greenpower.co.uk/events

Scrutineering Checklist Goblin: This checklist will enable you to feel confident that there are no mechanical issues that might affect the driving or safety of the car.

Test Drive: this needs to be done on a large hard surfaced area away from the general public and other vehicles. Most schools will have a large enough playground to practice in. Please ensure any obstacles are covered to protect the driver as well as the car.

These cars have the potential of driving at 15mph, so putting a new driver straight into the car is not advised. First of all, ensure that every driver and pit crew member understand the braking system, and how to stop, as well as where the cut-off switch is situated on the car. Also, how to turn the car on and off.

Once the driver is seated in the car, the rest of the team need to know how to fit and adjust the seat belt. To ensure correct restraint of

the driver, with the shoulder straps loose, the lap belt should be adjusted as tight as possible without becoming uncomfortable. Once the lap belt is tight the shoulder straps can then be tightened allowing just enough room to place your fingers between the belt and the driver's chest. If there is more than a finger width the belt needs to be adjusted accordingly. Once the seat belt is fitted correctly, the driver needs to wear a helmet (no cycle helmets allowed) again ensuring the chin strap is fitted correctly. If the helmet, does not have a visor then the driver needs to be wearing eye protection and lastly the driver must wear appropriate gloves, (not fingerless).

Best practice is just to initially push the car so the driver can get comfortable with the steering. Once all the team have practiced this, you can then wire up just one battery which halves the top speed and again, allows the driver to practice steering the car before fitting both batteries and driving at the optimum speed. You will quickly identify those who are comfortable driving and those who are not. Consider the height of the driver, as they need to be able to fit in the car comfortably with their legs outstretched within the car and the top of their helmet below the roll bar, then tighten the shoulder straps.



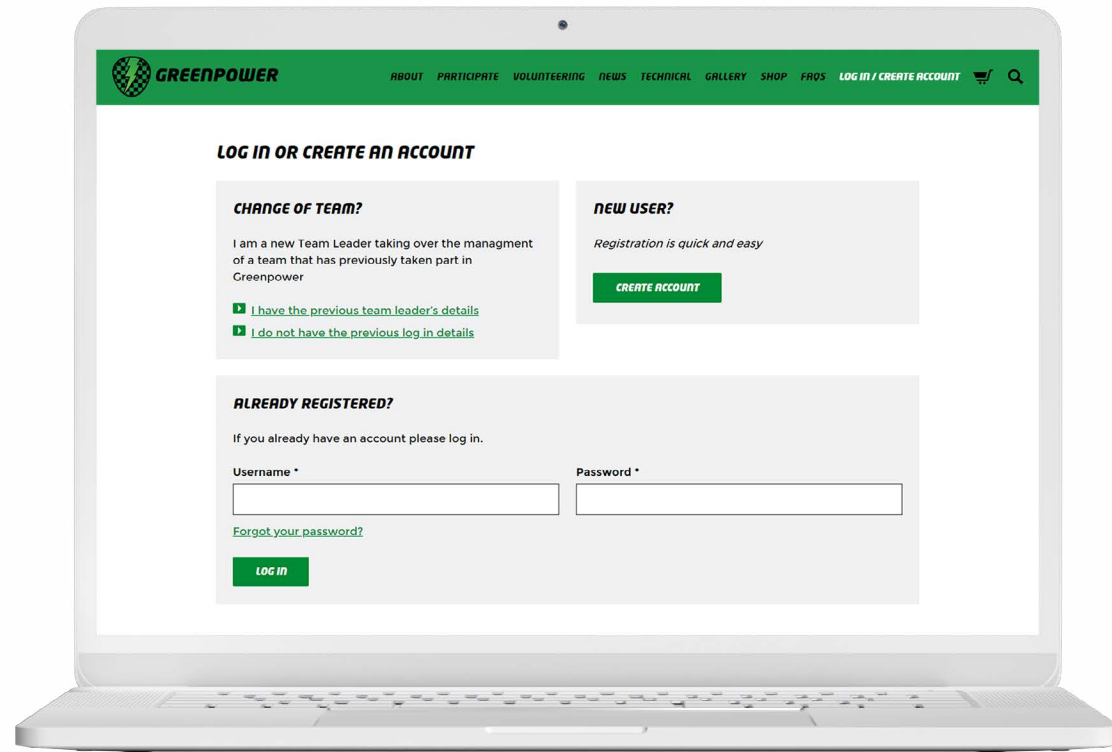
IET FORMULA GOBLIN REGULATIONS

Before setting off for the race circuit get in the habit of looking at the latest IET Formula Goblin Regulations which can be found on www.greenpower.co.uk/regulations this is a live document which will change each race season in some small way. Any new amendments will be highlighted in RED

WHEN DOES THE SEASON START?

The Goblin event season starts in March and runs through to July, finishing before the end of the summer term with the final 'Gathering of Goblins' event which is typically held at Goodwood Motor Circuit, West Sussex. This is open to all teams, from anywhere in the country. The Events calendar is available on the Greenpower website: www.greenpower.co.uk/events

The event calendar is published in December or January ahead of the season. Goblin events run at several locations in the UK, including Northern Ireland and Scotland. When possible, new events will be added to the calendar in areas where there is high demand.



HOW TO ENTER AN EVENT

To enter an event, you will need to register online, then log in to your online account www.greenpower.co.uk/user/login. You can then enter any of the Goblin events listed on the Greenpower events calendar. All events have closing dates for registration – usually around four weeks before the event. Once registration has closed all entrants will receive event information via the email address supplied and the team will be invoiced for the entry fee. All entries will be charged the full entry fee unless they are withdrawn before the closing date given on the website.

GETTING TO THE RACE

This is always a concern with regards to transport to and from the event. Dependant on the size of your team and how many spectators you plan to bring along will of course dictate the size of the vehicle you bring. When using a coach, you still need to consider the

transportation of your kit car. Most coaches have side storage and if you remove the roll over bar and batteries on your Goblin kit car prior to travel, it should fit in the bottom easily. If you are not travelling by coach the Goblin kit car can be transported in several ways, such as; on a roof rack, inside the boot of a people carrier, in a trailer or even a horse box.

In our experience, parents are fantastic supporters of the project, so getting them involved at an early stage through a presentation is invaluable, as you can 'pitch' your wish list, with regards to vehicles needed, also such things as a gazebo to ensure the team are kept out of the rain. In some race circuits you will have access to beverages etc, but packed lunches are advised. Also ensure the team have clothing for all weathers, from waterproofs to sunhats and sun cream. Once you've registered your team, you will receive event information with timings and final details via email.

RACE DAY

Between eight and 25 teams will compete on a typical Goblin race day, although there are three larger events held during the racing season too. During a race day each car will have the opportunity to take part in drag and slalom challenges and a head-to-head sprint.

Races - Each car has six attempts at the drag and slalom events. A minimum of one driver and one pusher and a maximum of 12 drivers and 12 pushers can take part.

Slalom event: The slalom event is a short course, driving through gates built with cones. One car runs at a time on the track and the quickest run of six attempts will go towards the final score for this event.

Drag event: The drag event is a straight-line race, with two cars running as fast as they can in a straight line at any one time. Each car is timed individually on each run – the fastest run of six goes toward the final score for the event.

Head-to-head sprint: In the head-to-head sprint up to three cars will race on a small track in one heat each, leading to a quarter-final, semi-final and a final (dependant on numbers) to determine an overall winner for this event.

Race Timetable

Typical race day timetable:

09:00 Arrival and signing on

09:30 Scrutineering

10:00 Team briefing

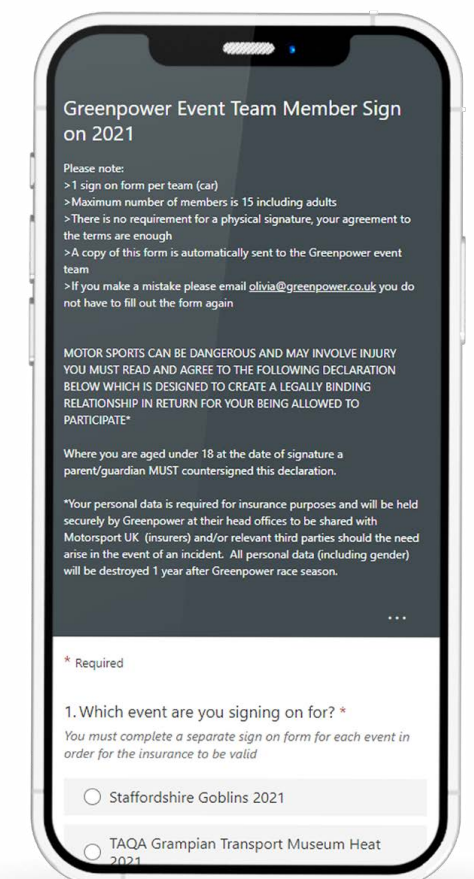
10:30 Slalom and drag events

12:30 Lunch

13:00 Sprint racing

14:00 Prize giving

Team Sign On: The team sign on, via the electronic [sign on form](#)





Scrutineering: A scrutineer will check the car over to ensure it is safe to compete. The Greenpower scrutineering process checks that all elements of your car are safe and that the kit has been built according to the regulations. The tallest driver, wearing a correctly fitting helmet, overalls, gloves and suitable footwear must be present, and the car itself. You will need to successfully pass scrutineering and obtain your scrutineering sticker before being allowed to compete

Risk Assessments: A risk assessment for race days is available on our website at: www.greenpower.co.uk/events

Insurance: All Greenpower operated events are run under a Motorsports UK (MSUK) permit and are fully insured with Personal Accident and Public Liability insurance. Each race meeting will have an event permit and number that will be on display at the event. Details of our insurance are available at: www.greenpower.co.uk/events

Awards: Cars are ranked on a scoring system for each part of the event and the lowest score wins the day. There are additional awards to be won

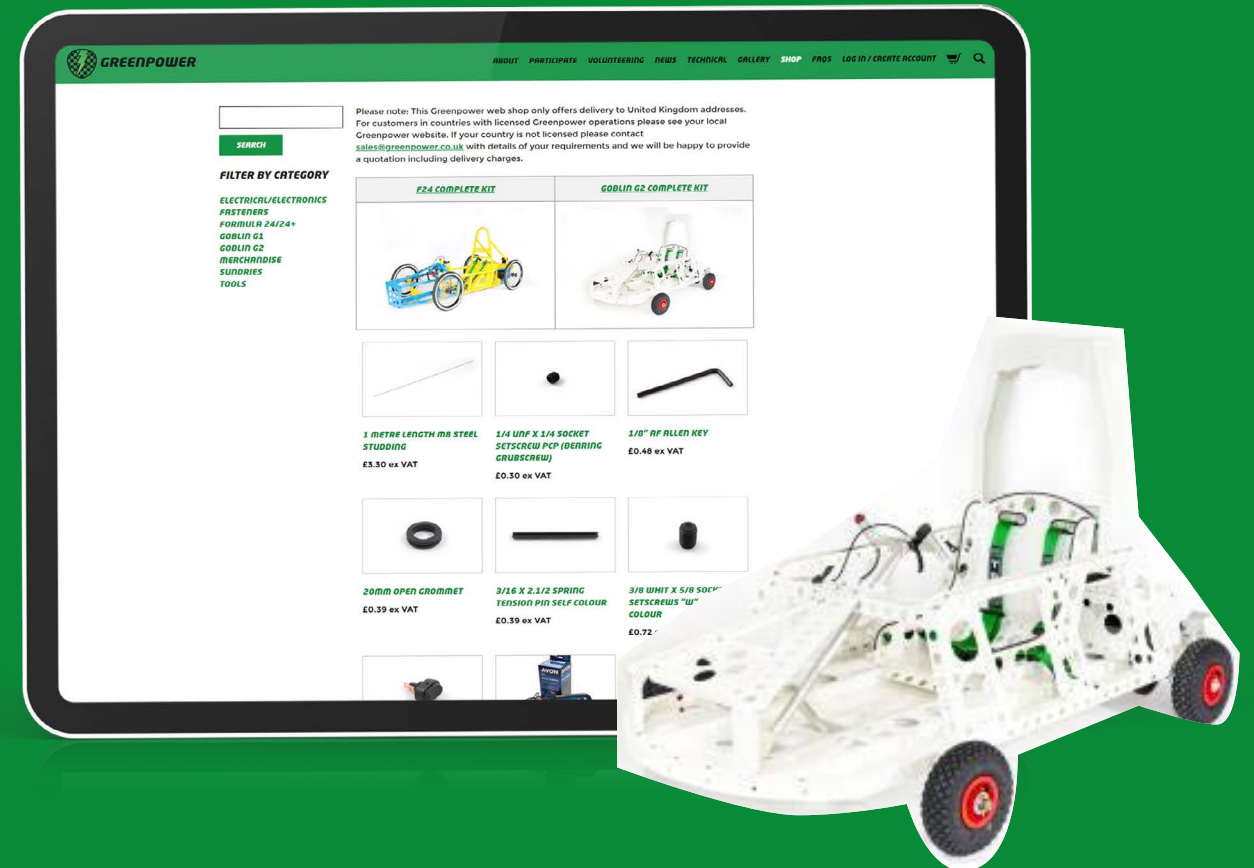
at an event which count towards your team's overall score.

Teams which hand in a portfolio will get minus points which will help lower their score and increase their chances of winning.

Additional awards at events are the:

- **Portfolio Award:** For the portfolio criteria please [click here](#).
- **Greenest Bodywork:** The use of natural biodegradable materials, or recycled materials
- **Best Bodywork:** Looking at best design, or constructed bodywork by the pupils
- **Best Presented Team:** Overall presentation of the team
- **Spirit of Greenpower:** could be working through adversity on the day, helping to support another team in difficulty.

All these awards are judged on the day by Greenpower staff and volunteers. There will be an award for the overall winner and where relevant the regional winners too. The criteria for all these awards can be found [here](#).



GREENPOWER SHOP

If you require any spare parts for your car due to wear and tear, loss or damage, or just as spares for race day then please go to our online shop www.greenpower.co.uk/shop

TO CONCLUDE

We hope that this Advice Booklet has been of some help in giving you a flavour of who Greenpower are, what we do and this amazing project. It is easy to put projects into an individual box and say that it's STEM, its engineering, English and/or Maths. A Greenpower project encompasses so many areas of education, but not only that, it creates an environment where your pupils will learn something else and demonstrate what amazing things they are able to achieve. As their self-confidence and self-belief grows, you will quickly see, as a teacher, the change in pupils who normally have difficulty engaging. With this new confidence, their attitude towards school, as a whole improves. Also, their behaviour improves as they realise that if they want to be part of the team they need to act appropriately. It's fantastic to see that pupils who have a history of non-attendance start to look forward to schooling. They become team players and through this fantastic project learn valuable life skills that will stay with them, literally, for the rest of their lives.

If you require any other information, please do not hesitate in contacting the Greenpower team via email: info@greenpower.co.uk or telephone 01243 552305 to arrange a visit from our Project coordinator or one of our ambassadors.



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