



## MINI EV PRIZE SOLAR PURSUIT RACE Rules and Regulations -2019

### INTRO

This solar car pursuit race is aimed at primary and high school students and or those who may have entered to 20m Solar Sprint Race and would like to test their skills of engineering and photovoltaics at the next level. While the cars are simple in design they need to be accurate and fast. This race will provide students with an insight to Sustainability, Statistics and STEM learning plus plenty of room for fun.

### THE CAR

In order to keep the race in line with the spirit of the competition there are some standards and some suggestions.

#### Standards

The car will be powered by one or two of the KM 2 volt 700mA panels. The car will have a KM – F18 motor

The car will have a majority of student input in construction

Will be no wider than 260mm

#### Must Have

An on off switch – 3 positions (Solar, Off, Battery)

Installed a 2 X AA battery pack without batteries

14mm clearance under the car

**A plate measuring 10cm x 2cm with your school name on it.**

#### Must NOT have

Batteries or any electronic charge devices. **Battery option is for poor weather conditions ONLY**

High tech/large dollar construction technique.

### CONSTRUCTION

You can use any materials for the construction of the chassis, axles and wheels. The kit uses 5mm corflute for the chassis and 3mm rod for the axels with small plastic wheels. Other materials you may wish to consider are balsa wood, Perspex, and craft board. It is important to consider weight and size. Wheels can be made from all types of material. The diameter of the wheel has an impact on torque and the 14mm clearance. In this event the guides and steering are important.

There are a number of races you will need to complete to get to the final so your car has to last. It needs to be durable.

Please have a read of the suggested text. It might help point you in the right direction.



### YOUR CHALLENGE

In this event the track is a continuous loop in the shape of an oval. This means your car will be required to follow the half circle loop at each end of the track. The guidance will be most important. Please take a good look at the picture on page three.

If you make the project too complicated there will more chance of failure due to breakdown. It is important to have a go at innovative ideas but this is about speed over a continuous course.

The gear ratio will have a large impact on the speed and acceleration of the car. You will need to do some testing for different ratios and wheel size. You may even need to consider the ability to change the gear ratio on the day.

Using two solar panels will provide a good source of power but you will need to consider how to wire them up. It is a good idea to do some testing in different sunlight with different gear ratios. Remember to record your results.

### SCRUTINEERING

Prior to racing all cars need to be checked to establish if they comply with these rules. It is important that you read these rules carefully and take special note of the Standards, Must Have and Must Not have on page one. You need to fill out an online **registration form** at <http://www.hunterevfestival.net/mini-ev-prize-team-entry-2019.html> by the close of **Friday 14 November 2019**.

Cars will be checked and then given a race number. This number will then be used to call cars to the start line for racing. You will need to be alert so when your number is called we can get races started.

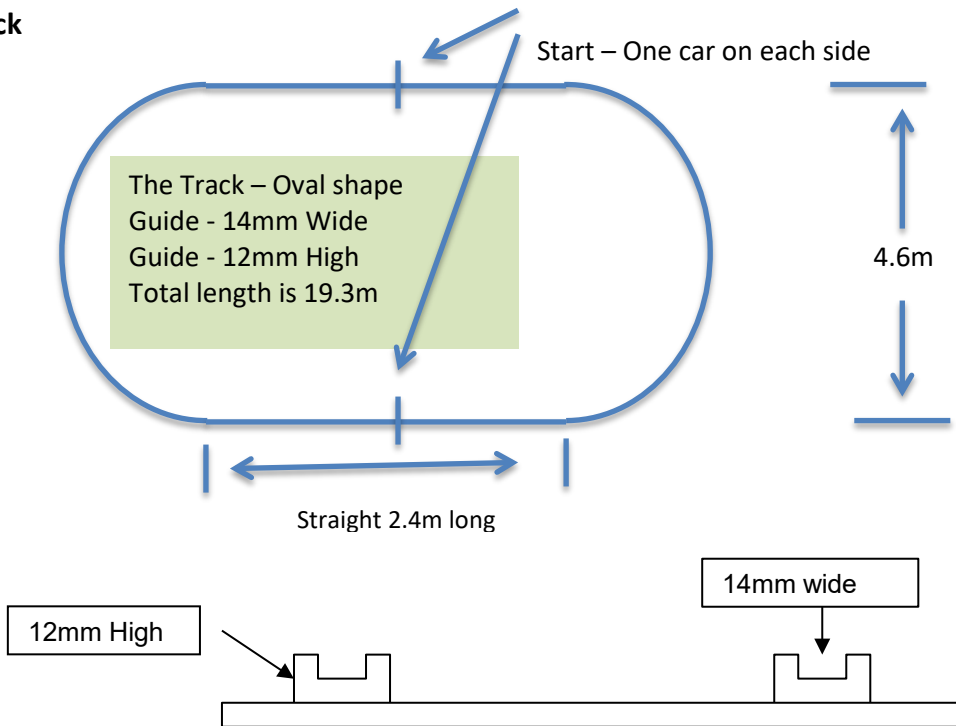
### THE TRACK

The oval track is made of corflute which is a smooth board. The guide is solid wood and approximately 14mm wide and 12mm high. The track is made up of 6 curve sections at each end. These 6 curves make a half circle and join the straight. Refer to the picture on page three. The straight section on each side is 2.4m long. The total length of the track is 19.3m.

We have done our best to make the joins as clean as possible however there will be some bumps and bulges. You will need to consider this and design your guides to cope with this.

If you are unsure about any aspects of the track please contact me.

### The Track



### THE START

Students will be asked to place the car on the track, one on either side. It is important to make sure your guides are correctly lined up with the track. Students will need a cardboard “paddle” to cover the solar panels and then turn the switch to the ON position with the panels covered.

When the cars are ready the starter will call, Ready, Set, GO. The student will lift the cardboard paddle to expose the solar panels to the sun and the race will start. As there is a car on each side of the track facing the same way, the winner is the first car to catch the other. If both cars are the same speed and they look unlikely to catch each other, both will be declared the winner of that race.

Points to consider.

1. The car needs enough power to start from a standing start.
2. The “paddle” needs to fully block the sun so the car will not move at the start line until the “paddle” is removed.
3. You need to get the car on and off the track as easily as possible.
4. As this is an oval track the guide system will be important.

### THE RACE

The race is finished when one car catches the other or both are declared winners.

The overall event will be a series of heats. The winners move forward to round two, the losers have another series of heats and the winners of these heats move into round two as well.



Round two will be a knock out series of heats. Winners move forward and losers cheer on the winners until we get an overall winner.

If there is not enough solar power on the day we will provide battery packs and the last four winners will be best of three races with changing over battery packs.

### TEAM REGISTRATION 2019

In 2019 there are two stages to the online registration process. The first Stage is Team Registration on the weebly website at

<http://www.hunterevfestival.net/mini-ev-prize-team-entry-2019.html>

Following weebly registration. Teams Registration needs to be re-entered into Eventbrite for parents/guardian and or school to grant permission for students to participate and provide media waiver for each team member at

<http://www.hunterevfestival.net/register-mini-ev-team-in-eventbrite.html>

### PRIZES

The Mini EV Prize competition is designed to drive both innovation in electric vehicle design and skills development in Science, Technology, Engineering and Mathematics (STEM). The competition rules lay an excellent foundation to engage young people in science, engineering and technical trades as well as project management, team work and entrepreneurialism. School participants have opportunities to connect with and get assistance from experienced STEM practitioners.

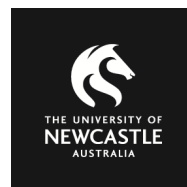
The Mini EV Prize is open to schools across Australia and includes the following prizes in 2019:

#### Primary Division Prizes

1. Primary Schools **Design, Innovation and Entrepreneur Prize** – Solar Sprint& Solar Pursuit Race Entries are eligible to participate in this award – **Winner 2018** - **St Philips Christian College The Falcons/The Phoenix**
2. Primary Schools **Team Spirit Prize** – **Winner 2018** - **St Philips Christian College The Falcons/The Phoenix**
3. Primary School – Solar Sprint Race – **Fastest Car** – **Winner 2018** - **Thornton Public Thornton Sparks L8RSTPS**
4. Primary School – Solar Pursuit Race – ‘**Cambridge Bumps**’ most number of Laps – **Winner 2018** - **St Philips Christian College Helios/Sun Ray**

#### High School Division Prizes

1. High Schools **Design, Innovation and Entrepreneur Prize** – Solar Sprint& Solar Pursuit Race Entries are eligible to participate in this award - **Winner 2018** - **Bossley Park High Rusteze/Lightning Mc Queen**
2. High Schools **Team Spirit Prize** - **Winner 2018** - **Cardiff High The Flash/Scarlet Speedster**
3. High School – Solar Sprint Race – **Fastest Car** - **Winner 2018** - **Gorokan High - Gorokan High2 /ENZO 2018**
4. High School – Solar Pursuit Race – ‘**Cambridge Bumps**’ most number of Laps - **Winner 2018** - **Gorokan High -Gorokan High1 /SHRECK 2018**



### Suggested Reading

- Model Solar Car Racing by Peter Harley - Available from Kite Magic Coogee
- Model Solar Cars: Optimising Their Performance by Stan Woithe - Available – Give Kite Magic a call

### The Venue

The Mini EV Prize race day is on **Wednesday 27 November 2018** to be held at the Cameron Park Race Track. All cars participating in the competition are to be scrutineered on race day before the race begins.

### Solar Car Kit – Supplied by Kite Magic

Item	Qty
Solar Panel – KM 2v 700mA Panel	2
Motor – KM F-18FS & Mount	1
Axel – Fibreglass rod 3mm & collars	2
Corflute sheet	1
Wheels	8
Gear Pack	1
Switch	1
Cable Ties	1
Wire – Red & Black, 2 pieces	2/.35m
2 x AA Battery Pack	1

### Construction

You will need some glue and a soldering iron plus some tape to hold things in place. If you have any questions or are unsure of any aspect please contact me before the day so we do not have troubles on the day.

Have fun and good luck.

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