Hunter Valley Electric Vehicle Festival 2024

Mini EV Challenge General & Safety Information

Purpose

Wednesday the 27th November 2024 9am – 3pm

The Hunter Valley Electric Vehicle Festival 2024 Mini EV Challenge is open to all Hunter Valley Primary and Secondary/ High Schools and beyond to be held Wednesday the 27th November 2024 from 9am – 3pm. **Should COVID restrict a live event, we will move to an online event and provide details at that time.**

The goal of the HVEVF Mini EV Challenge is to stimulate careers, innovation, teamwork, skills development and entrepreneurialism in Solar Vehicle design and construction.

How to Build Videos

Car building video 1 https://youtu.be/mm_wuINhU94

Car building video 2 https://youtu.be/liaLow4u6OY

About the Mini EV Challenge

The HVEVF Mini EV Challenge includes two key races and two divisions. The following prizes are awarded in each division:

A. Solar Sprint Race – Speed
B. Solar Pursuit Race - Endurance
C. Design, Innovation and Entrepreneurship
D. Team Spirit Prizf

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A. Solar Sprint Race (Straight Track) - SPEED

- ✓ Primary Division - Years 3-6 $150 first prize
- ✓ Secondary Division - Years 7-12 $200 first prize

B. Solar Pursuit Race (Oval Track) - ENDURANCE

- ✓ Primary Division - Years 3-6 $150 first prize
- ✓ Secondary Division - Years 7-12 $200 first prize

C. Design, Innovation, Entrepreneur Award/Prize

- ✓ Primary Division - Years 3-6 $150 first prize
- ✓ Secondary Division - Years 7-12 $200 first prize

The Design & Innovation Prize will be awarded to the team that has best designed and implemented a component or device that is part of the solar powered car. This may be either an electrical or mechanical component on the car.

- ✓ This scorecard in 2024 includes the learning assessment of STEM.

- ✓ The Design, Innovation, Entrepreneur and Team Spirit Award 2024 is open to all schools entering the Mini EV Challenge.

D. Team Spirit Award/Prize

- ✓ Primary Division - Years 3-6 $150 first prize
- ✓ Secondary Division - Years 7-12 $200 first prize

- ✓ Teams entering the Team Spirit, Prize must demonstrate positive interaction between innovators, supporters, and teachers.

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MINI EV RACES

Rules and Regulations -2024

INTRODUCTION

This solar car race is aimed at primary and high school students to learn the skills of engineering and photovoltaics. 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.

Rules and regulations for 20m Straight

SPIRIT OF THE COMPETITION

We ask students to enter the "Spirit of the Competition." We hope students will learn new skills and be prepared to be involved in fair and fun racing. We are encouraging ideas and innovation but not dollars.

THE CAR

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

Standards

Primary Schools Division - The car will be powered by **one** 2-volt 700mA panel High

Schools Division - The car can be powered by up to **two** 2-volt 700mA panels

The car can have one basic motor The

car will be constructed by you. Will be

no wider than 260mm

Must Have

Toggle switch, centre off and one way solar and the other battery and clearly indicated. 16mm

clearance under the car plus an empty 2xAA battery holder.

A plate measuring 10cm x 2cm with your car **name** and **number** on it incorporated into the design.

Must Not have

Batteries installed or any electronic charge devices High

tech/ large dollar construction technique.

CONSTRUCTION

While there is a kit for this event you can use any materials or components for the construction of your car if it complies with the Standards, Must Have and Must Not Have above. You may wish to consider balsa wood, Perspex, and craft board and a whole range of other materials. It is important to consider weight and size. The diameter of the wheel has an impact on torque and the 16mm clearance.

There are a number of races you will need to complete to get to the final, so your car must last. It needs to be **durable and well-engineered**.

YOUR CHALLENGE

Your challenge apart from being first across the line is the accuracy of construction and strength. Alignment of wheels and motor are most important. The track is a straight line, so you need the car to track as straight as possible. Attention to detail and engineering are most important. Friction will be your biggest problem.

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 due to the weather conditions.

It is a good idea to do some testing in different sunlight with different gear ratios.

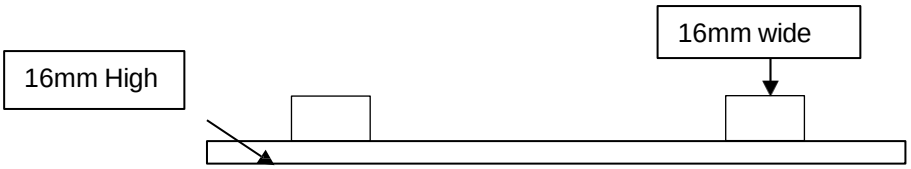
SCRUTINEERING

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.

Cars will be checked against these rules before the racing starts.

THE TRACK

There is a square channel stuck to a flat smooth board (Corflute). The length of the track is 20m. The car will need some form of guides to ensure it will run smoothly along the track, these guides will be on the outside of the square channel. We will race two cars at a time, one on each track. The track is joined every 2.4m and this join creates small bumps. Your guides will need to take this into account.



THE START

Students will be asked to place the car on the track and align the guide system. You will need a cardboard "paddle" to cover the solar panel and then turn the switch to the ON position for your car.

When the cars are ready the starter will call, Ready, Set, GO. The student will lift the cardboard paddle to expose the solar panel to the sun and the race will start. The race is to the other end of the 20m track. One of your team members will be the catcher at the finish line.

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.

THE RACE

The race will be a series of heats. The winners move forward to round two, the losers may have another series of heats and the winners of these heats move into round two as well. This can change due to the number of cars.

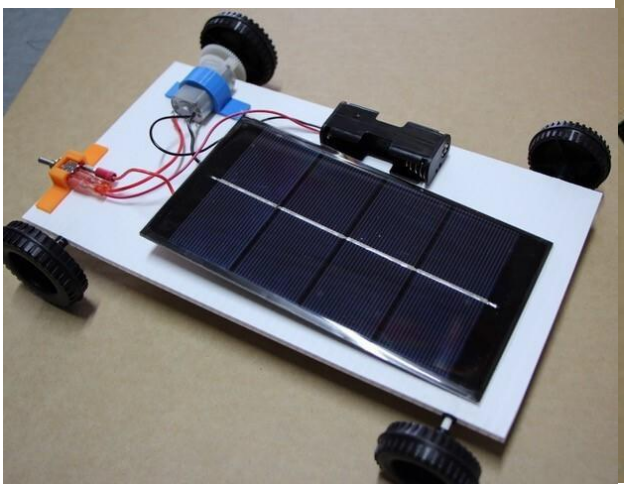
Round two will be a knockout series of heats. Winners move forward and losers cheer on the winners until we get an overall winner.

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

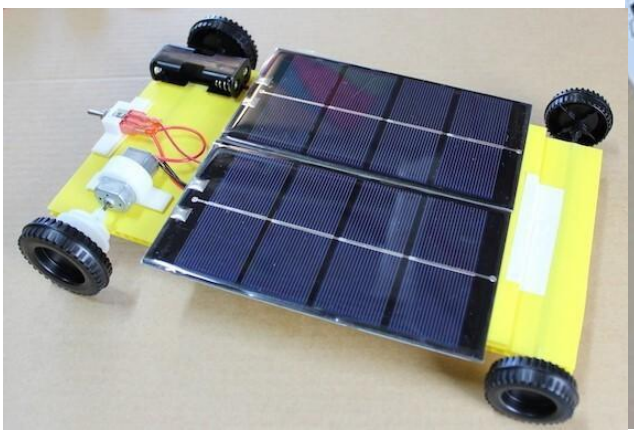
Have fun and good luck.

Hunter Valley Electric Vehicle Festival 2024

PRIMARY KIT



HIGH SCHOOL KIT



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Pursuit Solar Car Rules and regulations

THE CAR
To keep the race in line with the spirit of the competition there are some standards and some suggestions.

Standards (Same as Straight Track)

Primary Schools Division - The car will be powered by **one** 2-volt 700mA panel High

Schools Division - The car can be powered by up to **two** 2-volt 700mA panels

The car can have one basic motor The

car will be constructed by you. Will be

no wider than 260mm

Must Have

Toggle switch, centre off and one way solar and the other battery and clearly indicated. 16mm

clearance under the car plus an empty 2xAA battery holder.

A plate measuring 10cm x 2cm with your car **name** and **number** on it incorporated into the design.

Must Not have

Batteries installed or any electronic charge devices High

tech/ large dollar construction technique.

CONSTRUCTION
While there is a kit for this event you can use any materials or components for the construction of your car if it complies with the Standards, Must Have and Must Not Have above. Materials you may wish to consider are corflute, balsa wood, Perspex, and craft board plus 3D plastics and acrylic. 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 16mm clearance. In this event the guides and steering are important as it is an oval track. No matter what materials or components you choose, safety is most important.

There are a number of races you will need to complete to get to the final, so your car must last. It needs to be durable and well-engineered.

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 car guidance will be most important.

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.

It is a good idea to do some testing in different sunlight with different gear ratios. Remember to record your results.

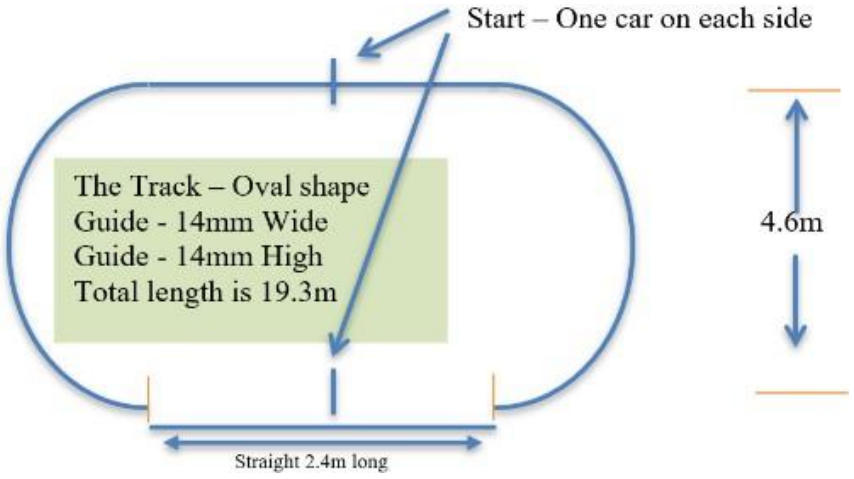
SCRUTINEERING

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.

TRACK

The oval track is made of corflute which is a smooth board. The guide is solid wood and approximately 14mm wide and 14mm high. The track has been designed with six curve sections at each end. These six curves make a half circle and join the straight. Refer to the picture below. 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.



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 finishes when one car catches the other or both cars are declared winners. In low light it might be the car which travels the greater distance.

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 knockout 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 batteries and the last four winners will be best of three races with changing over batteries.

Have fun and good luck.

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

Registrations/ Entry closes

You need to fill out an online **registration form and order your car kit** at http://www.hunterevfestival.net by the **6th November 2024**.

The Venue

The Mini EV Challenge race day is on **Wednesday 27 November 2024** and will be held at the TAFE Grounds Newcastle. Should COVID restrictions stop a LIVE event, the event will be held online with details to follow at that time. All cars participating in the competition are to be scrutineered on race day before the race begins.

HVEVF 2024

Mini EV Challenge

Safety Information

Safety First - Our goal is to run a fun and safe event. This means adhering to some sensible guidelines. The organisers reserve the right to exclude any team member or spectator from the event facility should they believe their presence threatens their safety, the safety of others or the smooth running of the event. The decision of the organisers is final, and no appeals by teams will be accepted.

Sun and Rain - Exposure to the weather is inevitable. Teams should ensure that they have adequate shelter available for their team and spectators. A hat, sunscreen and appropriate clothing for the conditions are recommended. Team members should drink water regularly throughout the day, even if the day is cool.

Power Up - Teams are encouraged to bring 6 'new' double AA batteries in case of bad weather. Teams may bring more than six batteries if desired.

Race Area Rules - All activities in the Race area and circuit are under the control of the race director. All teams must always comply with the directions of the race co-ordinator Michael Richards. Failure to do so will result in exclusion from the race at the discretion of the race co-ordinator.

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Hunter Valley Electric Vehicle Festival Mini EV Challenge Team Checklist

- ✓ Completed Team Member declaration and media release online form for
- ✓ Each person listed on the Team Registration Form
- ✓ Completed scrutineering form for scrutineering checks
- ✓ Completed Design, Innovation and Entrepreneurship Award and Team Spirit Award Form prior to judging times to be eligible for two additional awards
- ✓ Solar powered constructed car that complies with race rules
- ✓ Cardboard paddle to cover solar panels on the car at the race start line
- ✓ Two team members nominated as the Race Starter and the Race Catcher for each team
- ✓ Ruler for measuring
- ✓ Six 'new' AA batteries as wet weather provision
- ✓ Tools, spares and similar (at discretion of team)
- ✓ Sunscreen/hats
- ✓ Food and drinks
- ✓ Complete Student Surveys at end of day
- ✓ Complete Teacher Surveys at end of day
- ✓ Please complete an incident report form for any incident on site

This is a NO SMOKING, NO ALCOHOL & NO DRUGS event

Any last-minute questions or problems please contact: events@careerlinks.nsw.edu.au

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