



# EV Guide



## When + Where

**WED 17 SEPTEMBER 9AM - 3PM | TIGHES HILL TAFE**

This event aims to educate students about renewable energy and capacity build STEM skills in an exciting and hands on way. Firstly designing, engineering and building their solar vehicles in the classroom they can then race their cars and boats in a series of fun races at the EV Challenge!

Win cash prizes, trophies and school recognition- experimentation, innovation and teamwork are the keys to success!



# EV CHALLENGE

On the EV Challenge event day, your team will compete in a number of races on the straight and oval track, so your car must be durable and well-engineered. While designing your car. It is important to consider weight and size, the alignment of the wheels and motor, the tracks, friction and the gear ratio. If you are participating in the boat races you should also consider shape and form in order to develop a boat that will most effectively travel along the surface of the water. It is also important to do some testing prior to the event.

Please check out the Teacher Resources on our website for hints and tips on construction and design including recommended materials. Step by step building instructions, videos and further teaching modules can also be utilised in the building of the kits. Please see the Rules and Guidelines document for any restrictions around what the solar vehicles must include.

The event will be a series of heats where the winning teams 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

## AWARDS

The Design & Innovation Prize will be awarded to the team who demonstrate the most innovative change to the kit provided. Students must complete the entry form prior to race day and have their vehicle scrutineered to win.

Teams entering the Team Spirit Prize must demonstrate positive interaction between innovators, supporters, and teachers. Feel free to dress up to support your team!

### SOLAR SPRINT RACE (STRAIGHT TRACK)



Primary Division  
First Prize to the value of \$150



Second Division  
First Prize to the value of \$200

### DESIGN, INNOVATION, AWARD/PRIZE



All Divisions  
First Prize to the value of \$150

### BOAT RACE (AQUA TRACK)



Primary Division  
First Prize to the value of \$150



Second Division  
First Prize to the value of \$200

### SOLAR SPRINT RACE (OVAL TRACK)



Primary Division  
First Prize to the value of \$150



Second Division  
First Prize to the value of \$200

### TEAM SPIRIT AWARD/ PRIZE



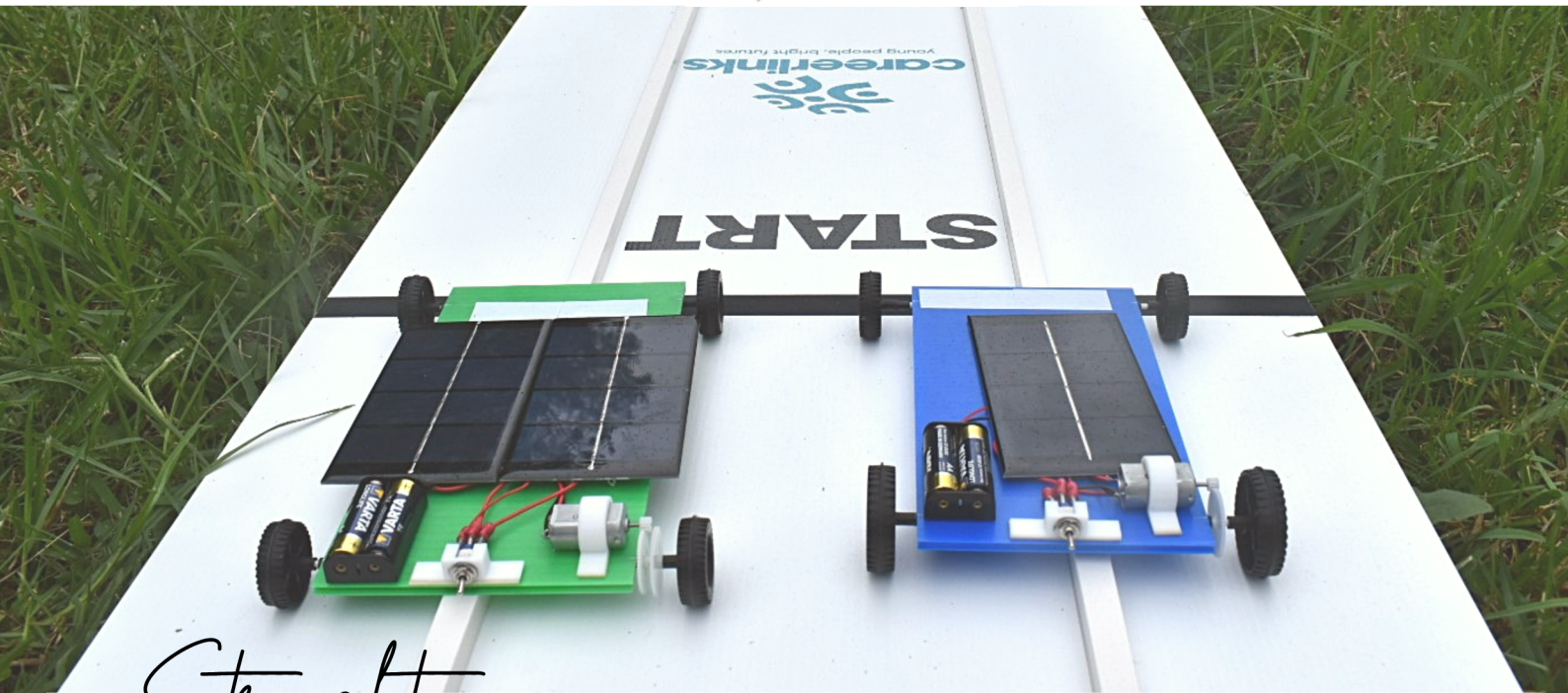
All Divisions  
First Prize to the value of \$150

### CO2 RACE (DRAGSTER TRACK)



All Divisions  
First Prize to the value of \$150





# Straight TRACK

This race will be testing your car for **SPEED**. 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 TRACK

The straight track is 20m in length and is a straight line made out of conflute and a solid wood guide. The track is joined every 2.4m which creates small bumps in the track. The car should be constructed with guides to ensure that it will run smoothly along the track. During this race, it is important that you ensure that your car is able to track as straight as possible. We will race two cars at a time, one on each track.

## THE RACE

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 you 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. Your challenge apart from being first across the line is the accuracy of construction and strength. It is important that you and your team read the guidelines to ensure you are complying with the rules as well as building a car that is durable and well - engineered.





## Oval TRACK

This race will test your cars **ENDURANCE**, the fastest car with the most staying power will win. The car guidance will be most important, but the gear ratio will also 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.

### THE TRACK

The oval track is made out of corflute and a solid wood guide and is a continuous loop in the shape of an oval. This means your car will be requested to follow the half circle loops at each end of the track. The track is 19.3m in length with curve sections on each end and 2.4m straight sections on each side which creates small bumps in the track. Guides and steering are the most important element of your solar car as it is an oval track. We will race 2 cars at a time, one on each side of the track as seen in the image.

### THE RACE

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 one of endurance and will continue until one car catches the other. Your challenge is not to be fastest over a short distance but to ensure your car is built to last. First across the line will demonstrate a balance of strength and speed.





# Aqua TRACK

This race will test your boats **BUOYANCY** and balance as well as speed, the winner will be determined by fastest across the finish line. The objective is to develop a boat that will most effectively travel along the water guided by a thin line suspended above the water to cover the distance of 10 meters in the shortest possible time.

## THE TRACK

The Aqua track is 10m in length and is filled to a depth of 10cms. Your boat will be guided by a thin line suspended above the water at a height of 300mm. Your boat should be designed to skim across the surface, smoothly as well as swiftly on the guide line. Your boat must stay on the guideline, If it comes loose and collides with another boat you will be disqualified. We will race two boats at a time, and the first one to reach the other side wins.

## THE RACE

You will have the opportunity to test your boat behind the start gate and then cover the panel to stop the motor. The starter will then ask you to uncover the solar panel and your boat should then push against the start gate.

The starter will call out “ready” “set” “GO” on the go the start gate will be dropped. First boat to touch the end of the pond or the boat which travels the longest distance along the guideline will win the race. Your boat will need to withstand the impact of crashing into the end of the pond.





# CO<sub>2</sub> Dragster TRACK

This race is all about speed- blink and you'll miss it! There is no kit-you may use any material you like ie Balsa wood, plastic, recycled materials or even 3D printed. Your car must be fitted at the back with a recess to fit a CO<sub>2</sub> cannister (for propulsion) and two loops (one at the front and one at the back) to keep it on the guideline. Design your car to be both light and aerodynamic for best results. Please see the Rules and Guidelines document on our website for any restrictions around the construction of your Dragster.

## THE TRACK

The Dragster track is a roll out track 20m in length and is designed to race CO<sub>2</sub> powered cars. These can be made of Balsa wood, 3D printed or even paper (we will have some of these available on the day for demonstration purposes). Your car will be guided by a thin line down the centre of each side of the track. We will race two cars at a time, and the first one to reach the other side wins.

## THE RACE

There will be an electronic starting gate which will count down from 3, 2, 1. When the countdown finishes and the display lights up, hit your button. This will burst the CO<sub>2</sub> cannister and your car will take off down the track at top speed. Whoever has the quickest reflexes, coupled with the fastest car will win!

All activities in the race area are under the control of the race coordinator. Failure to comply with the directions of the race coordinator will result in exclusion from the race



# HOW IT WORKS!

- Visit <https://www.careerlinks.nsw.edu.au/ev-challenge> and click register.
- Register your team/s by selecting primary or secondary and category (solar cars, solar boats and CO2 Dragsters).
- One kit will be provided to you for each team that you enter or BYO CO2 Dragster.
- We will send your kit/s out to you with more information about how to build it
- Build your kit/s in the classroom and test in the playground to get ready for race day!
- Bring your EV to race in the challenges, dress to support your team & prepare to have lots of fun!

Thankyou

## TO OUR SPONSORS



**PORT WARATAH**  
COAL SERVICES



**Newcastle Coal**  
INFRASTRUCTURE GROUP



**TAFE**NSW



**Regional  
Development**  
*Australia*



**HUNTER  
INNOVATION  
AND SCIENCE  
HUB**