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Kite Magic

Electric Vehicle CHALLENGE

by careerlinks

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

Guidelines- 2025

THE CHALLENGES:

In 2025 there are 6 Prize Categories with $150 Awarded for first Prize for Primary Schools (Years 3 - 6) and $200 for first Prize for Secondary Schools (Years 7 -12) for the Straight, Oval and Aqua tracks. The Team spirit, Design and Innovation and CO2 Dragster winners will be awarded $150 (there are no first and second divisions). Trophies, Certificates and bragging rights are also up for grabs!

SOLAR SPRINT RACE (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.

SOLAR SPRINT RACE (OVAL TRACK) This race will test your cars **ENDURANCE**, the fastest car with the most staying power will win. 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.

BOAT RACE (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 about the water to cover the distance of 10 meters in the shortest possible time.

TEAM SPIRIT To win teams must demonstrate positive interaction amongst their peers, competitors, supporters, and teachers. Feel free to dress up to support your team and express your creativity!

DESIGN & INNOVATION will be awarded to the team that has best designed and implemented a component or device that is part of the solar powered car or boat. This component may be either electrical or mechanical and should improve the overall design and performance.

RULES AND REGULATIONS:

SOLAR CARS STANDARDS:

The car will have one basic motor. The car will be constructed by the student. The car will be no wider than 260mm.
Must Have: Toggle switch clearly indicating centre off/ one way Solar/other way Battery. 16mm clearance under the car plus an empty 2 x AA battery holder in case of cloudy weather.
A plate measuring 10cm x 2cm with the car name and number incorporated into the design.
Must not Have: Batteries installed as main power source (back up only). No high tech or large $$$ construction technique.

CONSTRUCTION

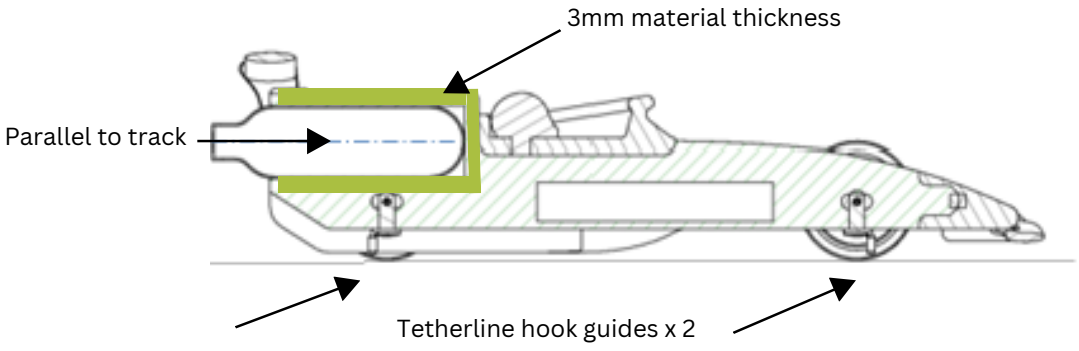
While there is a kit for this event you can use any materials or components for the construction of your car if it complies with the Standards Must Haves and Must Not Haves above. You may wish to consider balsa wood, perspex, craft board and a whole range of other materials. It is important to consider 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.

SOLAR BOATS STANDARDS:

Boat Size: The boat shall be no more than 550mm long and 300mm wide.
Blunt Nose: The front of your boat should be blunt to avoid getting stuck in the 13mm holes in the starting gate mesh. If unsure about this, please ask.
Guides: A thin line will be suspended 300mm+/- 25mm above the water, to guide your boat down the pool. You will be disqualified from the current race if you are the cause of a collision with another boat. Your boat must stay on the guide.
Solar cells: The boat is to be powered by commercially available silicon photovoltaic cells of up to 350 cm2 active area. Boats will not share panels.
No storage devices or batteries can be used.
Switch: An ON/OFF switch is to be included in the electrical circuit.
Inspection: The solar cells must be removable to reveal the inside of the boat.
Hulls: No commercially built or vacuum formed hulls will be allowed.
Motors: The total motor cost must be under $10.
Propulsion: Any form of propulsion can be used however it must not exceed the size requirement.

CO2 DRAGSTER STANDARDS:

Car size: Maximum width 85 mm this is to allow two cars to fit on the track side by side.
The chamber to house the CO2 cartridge should be 18mm-18.5 mm diameter wide and 45mm-58mm deep. This allows the cannister to fit snugly. There must also be a material thickness of at least 3mm around the cartridge chamber for safety reasons. The chamber must also run parallel to the ground when viewed side on. The tetherline hooks must be located front and back underneath the wheel axles. Please see diagram example.



SCRUTINEERING:
Prior to racing all cars/boats 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 haves" and "Must not haves".
Cars will be checked against the above criteria before the racing starts. Any deviation from this may result in disqualification. The final decision for any race lies with the Race Coordinator.

THE SPIRIT OF THE COMPETITION:
We ask all participants 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. All cars/boats and vehicles may be decorated any way you wish with your team name or any design of your choosing. We encourage ideas and innovation over prizes- above all HAVE FUN!

THE RACES:

STRAIGHT 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 guide 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.

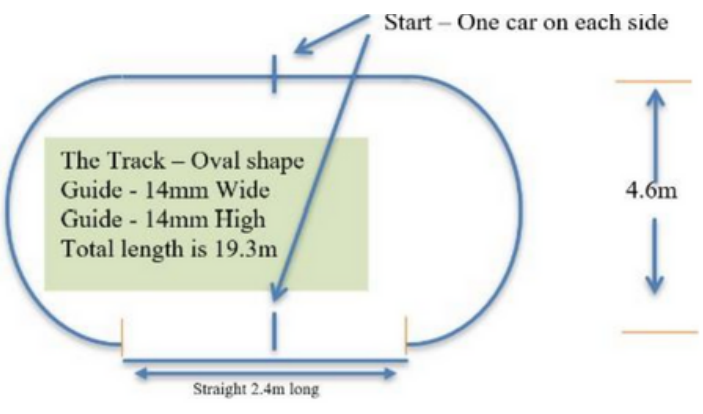
THE START:
Students will be asked to place the car on the track and align the guide system. You will need a cardboard "paddle" to cover the solar panel and then turn the switch to the ON position for your car.

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.

OVAL 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



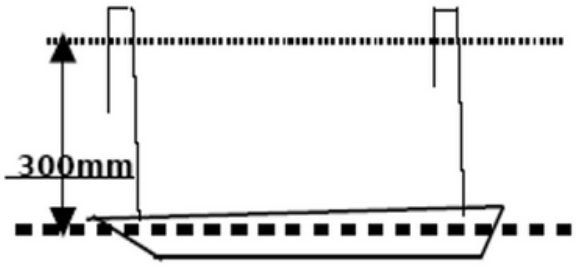
THE RACE:

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

Please bring spare batteries in case there is not enough solar power on the day, we will switch to battery power.

AQUA 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:

There will be a starting gate and the finish will be when the boat touches the end of the pond. Boats will be set up on the guideline and positioned behind the start gate. 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.

DRAGSTER TRACK:

The Dragster track is a roll out track 20m in length and is designed to race CO2 powered cars. There is no kit supplied so these can be made of any material you like. Think Balsa wood, recycled materials, perspex, 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 end wins.

THE RACE:

There will be an electronic starting gate which will count down from 3, 2, 1- GO! When the countdown finishes and the display lights up, hit your button. This will burst the CO2 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!

RESOURCES:

There are a number of Resources available to assist you in the building and racing of your EV Solar car and Boat kits.

BUILD INSTRUCTIONS (STEP BY STEP):

Primary School Car Kit: Primary Solar Car Building Instructions.pdf
High School Car Kit: High School Solar Car Building Instructions.pdf
Model Boat Kit: Model Boat Kit Instructions.pdf

HOW TO BUILD VIDEOS BY KITE MAGIC:

All Videos: https://www.youtube.com/@kiteman2034/playlists
Car Building Video 1: https://www.youtube.com/watch?v=Rr9UifR0mY8
Advanced Car Building: https://www.youtube.com/watch?v=ovlz3Rvuwe4
Boat Design: https://www.youtube.com/watch?v=BOQCYAGa0vI

For more information or trouble shooting regarding building your Kits please contact Michael at Kite Magic 02 9045 1662 or email info@kitesite.com.au

CURRICULUM LINKS AND TEACHING MODULES:

SOLAR CARS:
Stage 3 https://iteachstem.com.au/resources/race-the-sun-stage-3-unit-of-work-case/
Stage 5 https://iteachstem.com.au/resources/solar-car-challenge-unit-of-work-race/

CO2 DRAGSTERS:
Stage 5 https://iteachstem.com.au/resources/co2-dragsters/

THANKYOU TO OUR SUPPORTERS

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