Racing the Sun

Racing the Sun (RTS) is an exciting science, technology, engineering and mathematics (STEM) program that challenges high school students to design, build, and race solar-powered go-karts. It is open to all Arizona high schools.

RTS is organized and hosted by Tech Parks Arizona at the University of Arizona. The program is in its seventh year. Since its inception in 2011, more than 700 students have participated in the program. RTS began with three Tucson high schools and forty-three students. The competition has grown to include 16 schools from Tucson, Phoenix and Sierra Vista with 19 go-kart teams and more than 160 participants. The RTS program begins in August and concludes with Race Day in early May.

Racing the Sun addresses a top concern facing Southern Arizona technology companies, the lack of a skilled STEM workforce. The program is designed to introduce students to career pathways in STEM based industries. Students have the opportunity to work with industry mentors, participate in a career day and take field trips to high tech companies.

Working with teachers and mentors, students spend nine months preparing for Race Day. Along the way, they apply physics, engineering, and energy. They solve real-world problems, using mathematical, analytical, and critical thinking skills. Students are exposed to working in teams and collaborating on ideas. They are challenged to translate their ideas into a working prototype, and along the way they build leadership skills. In short, they gain the skills needed to succeed in the workplace, and they have great fun doing it!

These include:

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Building and racing a solar go-kart is a challenging task. The student teams are guided though the program by faculty advisors, industry mentors and university students who:

- Organize and teach workshops
- Judge team presentations
- Review kart designs and electrical plans
- Visit schools to check progress
- Offer advice to students, teachers and organizers
- Conduct safety inspections and troubleshoot on Test Day and Race Day

Program

Racing the Sun is more than just a go-kart competition and race. During the school year, the students and their teachers participate in a series of events. These include:

Teacher Orientation:
Prospective teachers gather for an informational meeting to determine the feasibility of competing in Racing the Sun. Topics such as program costs, program schedule, logistics, and expectations for all participants are covered.

Racing the Sun 101:
All students attend a comprehensive set of introductory workshops. Industry volunteers and university students lead interactive sessions on the use of solar panels, automotive geometry, structural issues, mechanical design, electrical systems, and kart components. Safety is emphasized in all workshops.

Design Review Day:
Students and industry mentors meet mid-term through the program to demonstrate progress with construction of the kart which is now about 50% complete. Mentors provide guidance and verify karts are in compliance with standards.

Career Day:
Students visit companies and universities as part of a field trip designed to inspire them to understand and pursue STEM careers and education. They tour multiple facilities engaged in solar energy, engineering, transportation, defense and security, and manufacturing.
**Team Presentations:**
Participants and guests meet at the Arizona Science Center in Phoenix or the UA Tech Park in Tucson to present their work to a panel of industry judges. Students describe the challenges they have faced in designing their go-karts, learn from other’s experiences, defend their design decisions, and outline the lessons learned as they worked on their karts throughout the year. This event showcases the accomplishments of the students and highlights the learning outcomes in front of potential future employers.

**Test Day:**
All participants conduct a trial run and qualifier on the Musselman Honda Circuit in preparation for Race Day. The event includes safety and regulation checks, driver training and gear checks, and an opportunity to see the competition and test their go-karts in the same conditions they will experience on Race Day.

**Race Day:**
Racing the Sun culminates with a final competition at Musselman Honda Circuit in Tucson. The event is open to the public. Families, educators, sponsors and mentors are invited to cheer the teams as they engage in friendly rivalry on a professional racetrack. Awards are given for speed, endurance and the most energy efficient solar go-kart. The coveted Grand Champion Award is given to the team that scores the most points over the entire course of the program.
Go-Karts

Racing the Sun is a rigorous and challenging program. The student teams must compete under a set of rules designed to promote competition fairness. The team may compete using one of two types of go-karts:

The **Standard Kart** uses a pre-fabricated steel frame chassis. It bolts together without the need for welding. It comes with standard wheels, a seat, a safety belt, mirrors, and a solar panel mount. This kart is great for first-year teams, schools with less technical expertise, or those lacking specialized facilities and equipment. The standard kart chassis is not meant to be modified.

The **Maker Kart** is for experienced teams who want to build a kart from the ground up. They design and purchase their own materials. Teams building maker karts require specialized facilities, tools and expertise. They must submit their designs for approval prior to fabrication ensuring compliance with all competition rules and safety protocols.

Racing the Sun competition rules are on Tech Parks Arizona web site at [www.techparks.arizona.edu](http://www.techparks.arizona.edu)
Sponsors

Racing the Sun would not be possible without the support of community partners and sponsors. The program is led and organized by Tech Parks Arizona and the Campus Research Corporation. Tucson Electric Power is the title sponsor. Other sponsoring organizations include: Ascensus, AzRise, Arizona Science Center, Bay 4 Energy, CAID, Global Solar, Musselman Honda Circuit, Nextera Energy Resources, P3 Solar, Rosendin Electric, Tucson Unified School District Education Enrichment Foundation, and Campus Research Corporation.

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