

## Junior Solar Sprint Virtual Rules



*These rules are for the Junior Solar Sprint virtual competition which does not include an in-person race of the finished cars. These rules are not valid for in-person Junior Solar Sprint competitions.*

The goal is for students to build an eye-catching, durable, and fast moving solar-powered vehicle and then effectively present it via a student created web page. Designer(s) must use an approved solar panel and motor to power their vehicle. However, the chassis, wheels and transmission may be constructed of any materials chosen by the vehicle's designer(s). Cars are judged on design, innovation and performance. Performance of the vehicle is evaluated on how fast and straight the vehicle moves under the power of the sun. No batteries allowed!

The Junior Solar Sprint Virtual competition is open to teams of 1 - 4 students in grades 4 - 8. The competition is divided into two divisions: Green Division (4<sup>th</sup> - 6<sup>th</sup> grade), and Blue Division (7<sup>th</sup> & 8<sup>th</sup> grade). Teams of mixed grade levels will compete in the division of the highest grade level student.

*Note: If your team intends to later compete in the EnergyWhiz event at FSEC with the car you are building now, it would be helpful to read the in-person rules for extra requirements in construction (battery box, eyelet, and a ping pong ball 'passenger') and web page (project log, design drawings, car specifications, and test results) that you can complete at the same time as you prepare for the virtual event.*

### Vehicle Design and Construction

The dimensions of a Junior Solar Sprint car cannot exceed:

- 30 cm in width
- 60 cm in length
- 30 cm in height

Each entry begins construction with a kit (Pitsco or Solar Made) containing:

- a 3V photovoltaic (PV) panel
- a motor matched to the PV panel

The solar panel and motor **may not** be modified. The specific motor supplied with the panel (in the kit) must be used. If a replacement motor is needed, the replacement must be purchased from the company that supplied the panel (or the FSEC Energy Research Center), and be the model of motor originally supplied with the panel. One solar cell and motor are permitted per car. Any modification to the solar panel or motor will result in disqualification.

Each team will research and acquire the appropriate materials and parts needed to complete their car.

- car body/chassis
- wheels
- axles
- wiring
- connectors
- gears

The solar panel is not to be used as the vehicle's chassis. If the axles and wheels are connected directly to the solar panel, the vehicle will be disqualified.

The body may be made of any material and decorated at the team's discretion.

At least one wheel must be driven by the motor.

Any energy enhancing devices, like mirrors, must be attached to the vehicle

No radio control is allowed in Junior Solar Sprint cars.

The vehicle must be safe (no jagged/sharp edges or projectiles).

**Failure to meet these expectations will result in disqualification**

### **Team Web Page Submission**

Each team will populate a web page on the Virtual EnergyWhiz site (using Wordpress) that showcases their JSS vehicle. The web page will include basic team info, vehicle photos, and a two part video as described below. These pages will be used to judge the project and will be viewed by other students, teachers and the public during Virtual EnergyWhiz.

**The web page must include:**

#### **1) Photo & Basic Info**

- Car/team name
- School name
- First names(s) and last initial of students on the team (no last names on the public page)
- Grade level of each team member
- Close up photo of completed vehicle (use this as the featured image on your page)

#### **2) Design Documentation**

- **Photos** – a minimum of six (6) photos of the completed car showing front, back, both sides, underside and top. Close-ups of special vehicle features may also be included and will help the judges understand the thought and effort that went into the vehicle's design and construction.
- **Design drawings** – (minimum of 2) that include measurements and dimensions.
- **Finished car specifications** that include: car size, weight, wheel size, gear ratio, and a list of the components used including the cost of each. Recycled and reused components should be included and listed as such.

**NOTE:** *Although it is expected that each team will document their design process through notes, drawings and other means, those are not required to be posted to the team's web page. However, teams may wish to include them on their page to favorably impress the judges, and further documentation may be requested if needed for clarification purposes.*

#### **3) Vehicle Features Video**

Once your vehicle is built, record a video that describes your vehicle's special features. One team member should hold the vehicle while that team member or other members describe and explain the following (maximum length 5 minutes):

- features of the vehicle that make it special and you believe make it a winner – the person holding the vehicle should point them out. Close-ups of these features are a must.

Remember, the judges need to see them!

- any unexpected outcome or discovery made by any team member as a result of the engineering, design and building process
- how the vehicle performed when you ran it in the sunlight
- anything else you want the judges to know about your vehicle or your team.

The video will be included on your project web page and hosted on our Vimeo site.

#### 4) Vehicle Performance Video

Provide a link to a video (hosted on another site such as vimeo or youtube) that shows your vehicle running under the power of the sun.

- Use a starting point (i.e. uncovering the solar panel which starts the car's movement) and an end point (i.e. a team member or team designee waiting at the end to catch the car) that are at least 10 meters ( $\approx$ 30 feet) apart.
- Prior to the start, one of the team members should state the date, the time of day, and the general weather conditions (sunny, partly cloudy, etc.). When ready, someone should clearly announce, "On your mark; Get set; Go!"
- The vehicle should move under the power of the sun only, with all wheels making contact with the flat surface. No pushing the vehicle and no lifting the wheels to get them spinning prior to the start.
- The video should show the car moving from start to finish without any editing to the video.

These are the minimum requirements for the web page. However, teams are encouraged to use the judging criteria as a guide to what extras they may want to include in their web page. For example, the web page **may** include:

- extra photos of the design, building and testing process
- project log - entries made on workdays documenting the engineering process
- test results (include weather for sun-fueled tests)
- any items that the team feels will showcase their car, or be helpful to the judges to pick them as the winning team!

Junior Solar Sprint web page submissions are due approximately one week before the opening of the virtual event. The exact due date will be communicated to the team and posted on the EnergyWhiz page.

### Competition Week

During the week of Virtual EnergyWhiz, all Junior Solar Sprint (JSS) pages will be available for public viewing. Students are encouraged to share their web page address with family and friends, and to visit other team pages.

### Judging Criteria

Awards (1<sup>st</sup> - 3<sup>rd</sup>) will be given for **Best Design** and **Most Innovative** in each division.

Best Design includes:

- **Chassis** - How well constructed is the frame? Were good design decisions used to improve the chassis over a plain flat sheet?
- **Wheels / Axles** - How well are the wheels, axles, bearings/bushings designed, built and

- mounted? Are the axles parallel so that the car will run straight?
- **Transmission** - How well mounted is the motor? Does the transmission (gears, belt, etc) effectively transmit power to the wheels?
  - **Solar Array** - How well oriented is the solar panel for light reception? Does the car use a design to improve the way the solar panel is positioned, attached, or collecting sunlight?
  - **Craftsmanship** - How well constructed is the car overall? Was care taken in the way the car was constructed?
  - **Performance** - Does the vehicle move without assistance? Does it reach the end goal? Is the car moving in a relatively straight line? Does it appear to be moving quickly?
  - **Web page** - Does the contents of the team web page document the design, building and engineering process in a way that the viewer can see how the vehicle works and see the special features that the team incorporated in their design?

Most Innovative includes:

- **Unique Design** - Does the car include elements that are unusual, unique, and not typical for a JSS car design?
- **Creativity / Artistic** - Has the team added artistic elements, decorations, personality, or fun creative elements to their vehicle?
- **Material use** - Has the team used unusual materials or materials in an innovative way? Did the students use recycled or earth-friendly materials?
- **Web page** - How creative is the team web page? Is it enjoyable?