



EnergyWhiz 2026

Junior Solar Sprint (JSS)

RULES



What is the JSS competition?

Junior Solar Sprint (JSS) is a national engineering challenge where students design, construct and race a model-sized, solar-powered vehicle. Teams must use a regulation kit containing a solar electric (photovoltaic) panel and motor, which energizes the vehicle that they design and build. The other parts of the car are made from materials of the team's choosing. Teams present their designs and evidence of their engineering process through a student-created web page, where they are previewed by a panel of judges. Teams then bring their vehicles to EnergyWhiz to compete in the 20 meter, wire-guided sprint race. Cars are judged on design and performance.

Who May Compete

JSS is open to teams of two (2) to four (4) students in grades four (4) through eight (8).

The competition is divided into two divisions. Teams of mixed grade levels will compete in the division of the highest grade level student.

- Green Division - 4th - 6th grade.
- Blue Division - 7th and 8th grade.

NOTE: Schools or clubs that have registered more than three JSS teams per division may be requested to select up to three of their teams to represent their organization at the racing component of JSS. This may be necessary depending on the number of overall teams enrolled given the limited number of tracks and prime sun hours available for racing solar cars within a four-to-five-hour time frame.

Because competitions run concurrently, individual students may only participate in two (2) competitions at EnergyWhiz as team members.

Important Dates

Events	Date
Project Webpages Due	Tuesday, April 14, 2026 by 6:00 pm
Web Pages Available for Public Viewing/Comments	Monday, April 20, 2026
Student/Team Names & Risk and Release Forms Due	Wednesday, April 22, 2026 by 6:00 pm
EnergyWhiz Event at FSEC	Saturday, April 25, 2026



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Requirements

Hybrid Vehicle Design and Construction

The vehicle must be designed to be a hybrid, with the ability to switch from solar power to battery power in the event of inclement weather or overcast skies.

Vehicle Size	
	The dimensions of a Junior Solar Sprint car cannot exceed : <ul style="list-style-type: none">• Width: 30 cm• Length: 60 cm• Height: 30 cm
Solar Panel and Motor	
	JSS Kit: Each entry begins construction with a JSS kit available from Solar Made or Pitsco. The basic JSS kit contains a three-volt (3V) photovoltaic (PV) panel and matching motor. <ul style="list-style-type: none">• The solar panel and motor may not be modified. Any modification to the solar panel or motor will result in disqualification.• The specific motor supplied with the panel (in the kit) must be used. If a replacement motor is needed, it must be purchased from the company that supplied the panel or from FSEC and be the model of motor originally supplied with the solar panel. Pitsco panel must use a Pitsco motor and a Solar Made panel must use a Solar Made motor.• One solar panel and motor are permitted per car.
Battery Holder	
	<ul style="list-style-type: none">• The vehicle must include a battery holder mounted on the vehicle that is capable of holding two AA batteries.• A switch or other easy to operate mechanism that can change where the power is coming from (from solar panel to motor to battery power to motor) is required. See <u>Inclement Weather</u> section for information on when batteries will be used.• No batteries will be carried on the vehicle unless directed by the race officials on the day of the event.
Passenger/Payload (Ping-pong ball)	
	<ul style="list-style-type: none">• Each vehicle must be designed to carry or hold one metaphorical passenger or payload.• The passenger/payload is represented by a standard, unmodified table tennis ball (aka ping-pong ball) of approximately 40mm in diameter.• The ball may not be glued, taped, permanently affixed or wedged into the vehicle.• The car design must allow for the purposeful removal of the ball (passenger/payload) with minimal effort. If the passenger or payload is dislodged during the course of a time trial or race, it is considered a DNF (did not finish).



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Car Components and Steering Device:

Car Components:	
	<p>Each team, on their own, will research and acquire the appropriate materials and parts needed to construct their car:</p> <ul style="list-style-type: none">• wheels• axles• car body/chassis• wiring• battery holder• connectors• gears• steering device/eyelet• passenger/payload (ping-pong ball) holder
	<p>The <u>body</u> may be made of any material and decorated at the team's discretion. Individual decals may be affixed. The vehicle must have a three (3) centimeter square space available on each side and the bottom for the vehicle's Sprint number decal, which is provided by the race committee at check-in.</p>
	<p>The vehicle must be safe (no jagged/sharp edges or projectiles).</p>
	<p>At least one wheel must be driven by the motor.</p>
	<p>Any energy enhancing devices, like mirrors, must be attached to the vehicle.</p>
Steering Device	
	<p>Steering Device: All JSS cars are required to have a mechanism (eyelet) permanently affixed to their chassis that keeps the vehicle on the racetrack guidewire (monofilament line). This guidewire extends the length of the racetrack and hovers one (1) centimeter (+/- .5cm) above the track's surface and helps to keep the vehicle in its lane. The guidewire will go through the vehicle's eyelet and serve as the steering mechanism keeping the vehicle in its lane. Proper placement of the steering device will allow for the most direct and efficient path to the finish line. This steering device must be able to be easily attached to the guidewire at the beginning of each heat by a team member and removed from the guidewire at the finish line by another team member. See some examples of eyelets on the next page.</p>
Items not allowed / Disqualification	
	<p>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.</p>
	<p>No radio control is permitted in Junior Solar Sprint cars.</p>
	<p>Closed eyelets are not permitted on JSS cars.</p>

Failure to meet these expectations will result in disqualification.

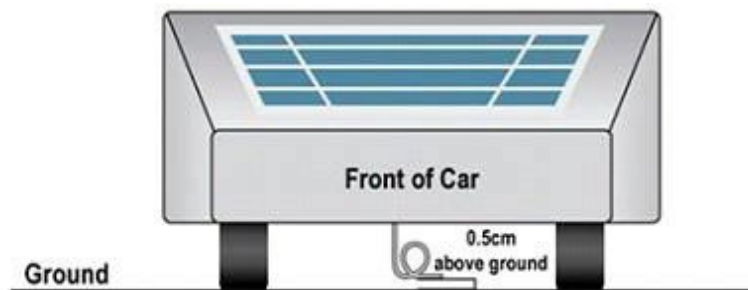
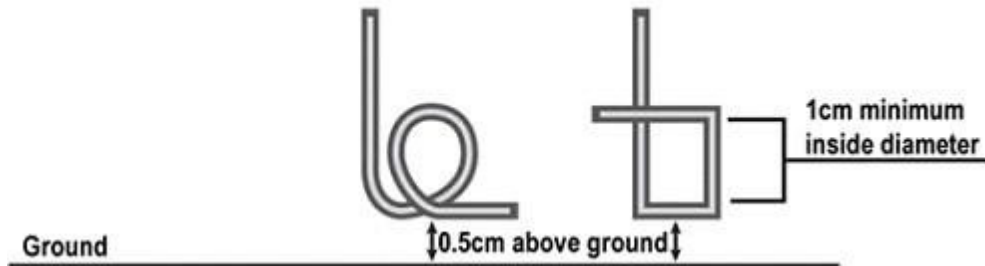


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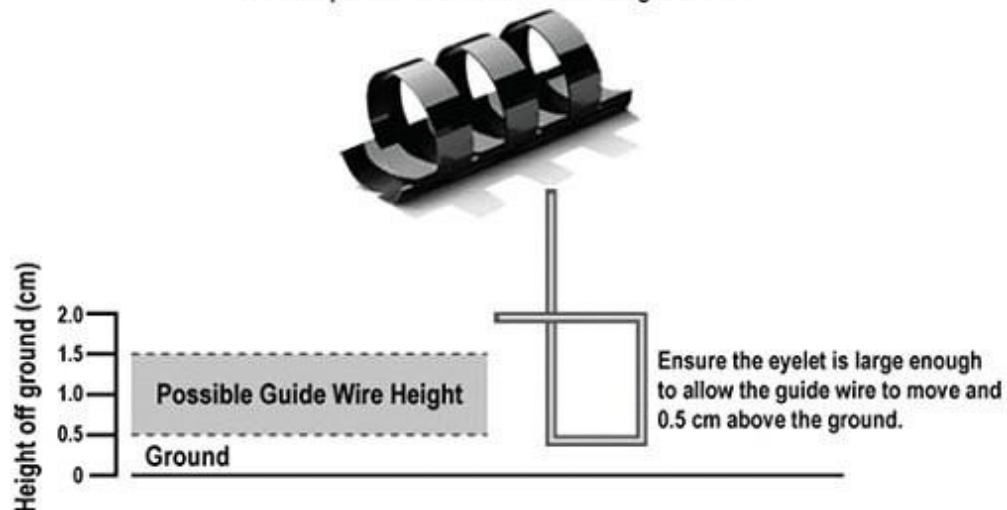


Steering Device/Eyelet Examples

Eyelet Examples using a paper clip



1cm plastic comb binding splines make excellent eyelets and are quick to attach/remove from the guide wire.





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Web Page

Each team will create a web page on the EnergyWhiz site showcasing their JSS vehicle. The web page will include basic team info, vehicle photos, notes on the design process, and a video describing important points of the car's design and decisions made by the team. This will be used to evaluate and rank the vehicle's design and construction and will be viewed by students and the public.

The web page must include:

1. Photo & Basic Info															
	Vehicle/Team name														
	Name of the School														
	First name(s) and last initials of students on the team (no last names on the public page)														
	Grade level of each team member														
	A close-up photo of the completed vehicle/car (use this as the <i>Featured Image</i> on your page). Be sure the project photo is clear/visible.														
2. Design Documentation															
	<u>Photos</u> - a minimum of <u>six (6) up-close</u> photos of the completed car <u>clearly</u> showing: <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">1. Front</td> <td style="width: 33%;">3. Right Side</td> <td style="width: 33%;">5. Underside</td> </tr> <tr> <td>2. Back</td> <td>4. Left Side</td> <td>6. Top</td> </tr> </table>			1. Front	3. Right Side	5. Underside	2. Back	4. Left Side	6. Top						
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2. Back	4. Left Side	6. Top													
	<u>Project Log</u> - The entries in the project log document each team meeting or work session. This can be a list, a table or an informal paper document that is scanned and inserted in the web page as photos. Entries include: <ul style="list-style-type: none"> ○ Date ○ Task or tasks ○ Time spent on the task or tasks ○ Team members present (initials or first names – no last names) ○ Obstacles encountered (if any) ○ Modifications to the car design (if any). 														
	<u>Design drawings</u> (minimum of 2) that include measurements and dimensions.														
	<u>Finished car specifications</u> that include: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">car size</td> <td style="width: 50%;">wheel size</td> </tr> <tr> <td>weight</td> <td>gear ratio</td> </tr> </table>			car size	wheel size	weight	gear ratio								
car size	wheel size														
weight	gear ratio														
	<u>List of components used and their cost.</u> Recycled and reused items should be included and listed as such. <table style="width: 100%; border: none;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 35%; text-align: center;">Item</th> <th style="width: 20%; text-align: center;">Cost</th> <th style="width: 30%; text-align: center;">New/Reused/Recycled</th> </tr> </thead> <tbody> <tr> <td>For example:</td> <td>Balsa wood</td> <td style="text-align: center;">\$3.00</td> <td style="text-align: center;">New</td> </tr> <tr> <td></td> <td>Plastic soda bottle</td> <td style="text-align: center;">\$0</td> <td style="text-align: center;">Reused</td> </tr> </tbody> </table>				Item	Cost	New/Reused/Recycled	For example:	Balsa wood	\$3.00	New		Plastic soda bottle	\$0	Reused
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3. Vehicle Performance Test - (minimum of 3) that include at least one test under battery power				
	Vehicle Test Information	Test 1	Test 2	Test 3
	Solar or Battery Power			
	Weather (Sunny, Cloudy, etc.,)			
	Date and Time of day			
	Distance Traveled			
	Time Elapsed			
	Speed (distance divided by time)			
	Comments on performance			
	Ideas for improving the car's performance (if any)			

4. Vehicle Features Video – (less than 5 minutes) to be included on your web page and hosted on our Vimeo site that includes one team member holding the vehicle while that team member or other members describe and explain the following:	
	The vehicle and/or team name, school or organization, as well as the first names of each team member and their grade level.
	Features of the vehicle that make it special. The person holding the vehicle should point them out. Close-ups of these features are required. Zoom in; the judges need to see them!
	Any unexpected outcome or discovery made by any team member as a result of the engineering, design building and testing process.
	How the vehicle performed when you tested it in the sunlight.
	Did you test the vehicle's performance under racing conditions (on a monofilament line)? Explain the results or why you did not test it on a monofilament line.

Teams should consider the following and are encouraged to use the judging criteria as a guide to what extras they may want to include in their web page.

- Do 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 as well as its special features?
- Are the photos large enough or close enough to see the working parts of the car?
- Is the video component of the webpage clear and understandable?
- Did the team fulfill the video requirements? Did they communicate effectively?
- Would schematics of the car, extra photos of the engineering process or any other pertinent information be helpful in the evaluation process and increase the likelihood of a higher score?

During the week prior to, and during the EnergyWhiz event, all JSS design pages will be available for viewing. Students are encouraged to share their web page address with family and friends, and to visit other team pages.



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Competition Day – Time to Race!

Note: Because competitions run concurrently, individual students may only participate in two (2) EnergyWhiz competitions as team members.

Check in - Vehicle Inspection (8:00 am to 9:15 am)	
	<p>The teacher or coach will check-in and receive an information packet containing:</p> <ul style="list-style-type: none"> ○ Schedule ○ Stickers with assigned vehicle number to place on the team's car ○ Team back signs and safety pins to attach on the back of each team members' shirts ○ Step by step (procedural) directions for the day ○ Certificates of participation for each team member.
	Teams must submit their cars for initial inspection at event check-in.
	<p>Vehicle inspection must be completed by 9:15. Cars arriving late will not be allowed to race.</p>
	Once inspected, vehicles will be impounded until race time, so cars need to arrive at the event ready to race.
The Track (Set-up by FSEC)	
	The racetrack is set up on a hard, flat smooth surface 20 meters long and 60 centimeters wide.
	A non-slick vinyl surface will be used for the track lanes.
	A monofilament line attached to two wooden, weighted palettes on either end of one lane of the track is used to guide one vehicle down the race lane.
	Two of the monofilament lines are set up parallel to one another to create two race lanes.
The Starting Line - Procedure/Rules	
	One team member will hold a solar obstructer (shade device) provided by the race officials above their car's solar panel (shading it) and will remove it when the start signal is given.
	Teams will race against other teams in their division to determine the first, second, and third place winners.
	Team members may not push a vehicle to start it. It should move under sun power.
	Team members may not accompany the vehicle in its lane during the race.
During the Heat - Procedure/Rules	
	Team members may not change the vehicle's mechanical or electrical characteristics (e.g. shift a transmission) after the start of the heat.
	One team member may free the vehicle from wire binding or track imperfections with the Track Official's permission.
	<p>DNF (Did Not Finish) - called when a vehicle:</p> <ul style="list-style-type: none"> • does not move off of the starting line for 15 seconds • stops before reaching the finish line • loses their passenger/payload (table tennis ball) prior to crossing the finish line • drives off the track



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	<ul style="list-style-type: none"> • crosses over into another lane • comes off the guide wire • does not cross the finish line • is ruled by a race official as such or is disqualified.
	Vehicles are to be promptly removed from the track after each heat or when a DNF is called.
	If a car comes off the guide wire and interferes with another car, the loose car will receive a DNF for that run. The opposing car(s) will be given a win if it occurs during double elimination heats or will be allowed another chance to run if it happens during time trials.
Between Heats - Procedure/Rules	
	Repairs may be made to vehicles as necessary between heats as time allows.
	No extra time will be given for repairs.
	The race will not be paused for repairs to be completed.
The Finish Line - Procedure/Rules	
	One team member must be present at the finish line to stop the vehicle.
	The vehicle must remain in its lane at the finish line until the officials have documented and finalized the results for that particular heat.

The JSS Race Format

The race will be conducted in two phases: time trials and a head-to-head double elimination format competition for each division (Green Division, 4th- 6th and Blue Division, 7th & 8th)

1. Time Trials - starting time for each division's time trials will be posted the day of the race.	
	<ul style="list-style-type: none"> • Teams may run their vehicle on the track up to three times within the time allotted and at the Official's discretion. • Teams report to the starting line whenever they are ready to run; car numbers will not be called during the time trials. • The vehicle's time will be recorded after each run. • A vehicle's best time out of all its runs is used to rank the vehicles.
	The Time trials will be offered every two minutes for a given time period. Once time is called by the judges, no more runs are allowed.
	The <u>ten teams in each division</u> with the fastest individual run times will move on to the head-to-head, double elimination competition.
2. Head-to-Head Competition - is a ten-team, double elimination race	
	A team must lose twice before being eliminated from this part of the competition. Teams who have lost one race are to remain in the area to wait for their next race to be called.
	Teams will race against other teams in their division to determine the first, second, and third place winners.

DECISIONS MADE BY THE RACE OFFICIALS ARE FINAL





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What happens if racing conditions are unfavorable (inclement weather)?

Partially Cloudy - The race will not be postponed for partly or mostly cloudy weather. Teams should be prepared to race in all moderate weather conditions.

Severely Overcast - If the solar irradiance averages less than 500 Wm^2 during a 15 minute period (as measured by equipment at FSEC) just prior to the start of either the Time Trials or one of the head-to-head competitions, the race will be switched to battery power.

Teams will be provided with:

- (2) AA rechargeable batteries that have been charged and tested for charge level prior to distribution by the race officials
- a cover for the photovoltaic panel on the car.

Only the batteries supplied by FSEC may be used. Once a division race is changed to batteries, it will remain battery powered, regardless of increasing irradiance levels. (Note: a typical full sun day at solar noon in Florida is usually 1000 Wm^2).

Rain/Thunderstorms - The race will be canceled if conditions are unsafe or if the track is unusable (too wet). If one division has raced, then only the second division's race will be canceled. If only the time trials have been run, those times will be used to award the race winners. If the time trial portion has not been completed, then only design awards will be given and no race will occur. All cancelation decisions will be made by the JSS administrative team. Once a race is canceled, it will not be reinstated even if the weather clears.

Evaluation and Judging

JSS vehicle design will be reviewed online and provided with a score and ranking based on the rubrics that follow. Final review of all projects happens in-person at EnergyWhiz.

Best Design - 1st – 3rd Place Awards: Given to top three scoring teams in each division for best design.

Race Performance - 1st – 3rd Place Awards: Given to top three place teams at the end of the races.



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CATEGORY	BEST DESIGN	MAX POINTS
Chassis:	How well constructed is the frame? Were thoughtful and imaginative design decisions made as to the chassis design and materials selected or was this merely a balsa kit put together following standard instructions? Is the chassis sturdy? Is it aerodynamic?	15
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? Do the wheels spin freely without rubbing the chassis?	10
Steering Device:	Does the vehicle have a secure open eyelet or other such device to attach to the guidewire (monofilament line)? Was the vehicle tested on a guidewire?	15
Transmission:	How well mounted is the motor? Does the transmission (gears, belt, etc.) effectively transmit power to the wheels? Does the vehicle move?	10
Wiring:	Is the wiring neat and organized? Are the wiring connections secure? How well is the battery box and switch incorporated into the vehicle design? Is it well thought out?	10
Solar Array:	How well oriented is the solar panel for light reception? Is the solar panel integrated into the design of the car? Does the design maximize sunlight collection in the way the solar panel is positioned or attached?	10
Craftsmanship:	How well constructed is the car overall? Was care taken so the finished product is neat with clean construction joints and attachments? Is the entire car sturdy?	15
Creativity/ Appearance:	Does the vehicle make a statement, convey a message or have a clear theme? Does the car include elements that are unusual or unique for a JSS design?	15
	Design SCORE	100

GOOD LUCK TO ALL JSS TEAMS!