

# Northeast Ohio Junior Solar Sprint Competition

NREL Activity Page: <https://www.nrel.gov/workingwithus/car-competitions.html>

LBMS JSS Website: <https://thonnings.blog/junior-solar-sprint/>

LBMS YouTube: [Playlist for JSS](#)

## Goal:

Design and build a vehicle that will complete a race in the shortest possible time using the available power of the sun. Teams use a kit containing a solar panel and a motor. Using any other materials, competitors will design and build a solar powered vehicle that will race on a 20-meter racecourse. The winner of the competition will be the team whose vehicle has the fastest time.



## Purpose (from the NREL)

“Building solar- and battery-powered cars requires skills in both math and science. The goals of the competition include:

- Generating enthusiasm for science, technology, engineering, and math (STEM)
- Improving students' understanding of scientific concepts and renewable energy technologies
- Encouraging young people to consider technical careers at an early age.

Teams work together building cars with *guidance* from a parent, teacher, or coach to compete in race and design categories.

## Open to:

Any middle school/student in Northeast Ohio

## Signup:

Email Kurt Thonnings at [thonnings@wlake.org](mailto:thonnings@wlake.org) and directions will be sent to you.

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[Click here](#) for pictures from a class working on the JSS

[Click here](#) for see a short movie made by a student from Boardman MS capturing highlights from last year's KSU race.

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## Rules:

### Materials:

- Official motor and solar panel must be used *without* any modification.
- Only 1 motor and 1 solar panel
- The remainder of the vehicle must be your own design and can be made from any other material.

### Building conditions

- It must be strongly noted that all participating cars **MUST** be made by the students themselves - at school - under the verbal



counsel of the advising adult/teacher. Our focus is on creativity, science and math principles, hands-on and safe construction practices, the design process and problem solving. We believe that making many mistakes and having imperfect vehicles lends to ownership, grit, growth mindset, and great team building skills.

#### *Vehicle Specifications:*

- General Rules
  - The vehicle must be safe to contestants and spectators, e.g., no sharp edges, projectiles, etc.
  - The overall dimensions of the vehicle must not exceed 30 cm. by 60 cm. by 30 cm.
  - Decals of the sponsor organizations (provided by your school) must be visible from the side on the body of the car.
- Pertaining to the solar panel
  - The sun's light is the **only** energy source that may be used to power the vehicle.
  - The solar panel must be able to be removed from the vehicle, and easily disconnected from the motor.
  - The body of the car must be three-dimensional, meaning that the solar vehicle must be structurally sound without the solar panel.
  - Teams will NOT be allowed to **anything** to the solar cell; The solar cell cannot be used as the body of the car.
- Guidance system
  - The vehicle must be steered via a guide wire that runs the length of the track- 20 meters (typically fishing line). The vehicle must be attached to the guide wire by a minimum of 1 attachment point.
  - The vehicle must be easily attached (and removed) from the wire without disconnecting the guide wire
  - Teams will have up to 90 seconds to get their cars attached to the wire, connect the motor leads, and place the cardboard starter board over the panel. (So practice!)

#### **Track Specifications:**

- The length of the race course is 20 meters
- Race lanes are at approximately 1 meter wide and there will be 3 to 5 lanes.
- The guide wire will be located in the center of the track and will not be more than 1.5 cm. above the track surface.
- The track is a hard, flat smooth surface such as a tennis court or running track.

#### **Conduct of the Race:**

- The NE Ohio JSS race, being limited by time constraints, will have 3 rotations of races. Each section will have a random mixture of school teams racing on 2 to 5 lanes, running 7 to 15 heats
- Race times will be taken for each car.
- If time is available, the fastest 3 cars from each section will advance to a final race-off
- Before each race judges will visually inspect cars for safety, size, official motor/panel and labeling.
- At race time, the vehicle will be placed behind the starting line with all its wheels in contact with the ground and an opaque sheet covering. The opaque sheet will be removed at the start of the race, allowing the vehicle to collect solar power and start driving.
- An early or push start may result in disqualification or a re-run of the heat. The determination will be left to the race judges.
- All vehicles will be started when the official signal is given.

- One team member must wait at the finish line to catch the vehicle.
- Team members may not accompany or touch the vehicle on the track. Vehicles stalled on the track may be retrieved after the end of the race has been declared.
- The vehicle and team member must remain at the finish line until the order of the race has been established.
- Lane changing or crossing will result in disqualification. (At the discretion of the judges).
- Challenges must be made before the race judges begin the next heat. All challenges must come from the student team members who are actively competing. The decisions of the race judges are final.
- Judges have the option to inspect cars prior to the final heat or at anytime during/after heats.

### **Rain**

- If cloudy conditions exist, races will be conducted with batteries. All schools are required to bring 2 AA batteries per car (or less if you wish). A battery holder with a switch will be provide at the start of each race. (reused for the next heat after the team that just raced extracts their own batteries)
- If rain conditions exist, an alternative indoor site will be available. At Akron that will on the 5th floor of the Press Box, the same floor as the TEDTalks, but at the opposite end of the floor.

### **Awards**

- No individual trophies will be awarded. Winners will receive a certificate via their advising teachers.
- A trophy will be given to the school that has the fastest car (But...only can keep it until the next year)