

Junior Solar Sprint

Host Guide Book

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Introduction

Welcome to the exciting world of the Junior Solar Sprint! You have taken on a fun, exciting program that captures the imaginations and creativity of young people, while providing an opportunity for volunteers to share their skills and ideas. There may be some headaches along the way (especially if the sun doesn't shine), but the result will be a great sense of accomplishment. The feedback you will receive from the students, teacher/mentors, and volunteers that participate in this program will make all your hard work worthwhile.

This guide is written as just that - a guide. It will tell you what to expect from the National Renewable Energy Laboratory (NREL), as managers of the Sprint, as well as give you insights for planning and executing a successful Sprint event. The appendices are the last portion of the Guide. You will find samples of letters, forms, and materials that have been used in previous years at various Host Sites. You may want to use this information for your Sprint, or create new documents. Should you choose to copy what is in the Host Guide, remember to update your letters, forms, and materials with the information that is pertinent to your Junior Solar Sprint competition. If you have something that works for you, please send us a copy. We'd love to share it with the other Host Sites!

And please note, support is just a phone call away. By dialing 1-800-NEW-ENGY (639-3649), 8 am to 5 pm Mountain Time, you will reach the Education Programs Office at NREL. If no one answers, please leave a message and we will return your call as quickly as possible.

We look forward to your participation in the Junior Solar Sprint. Have fun!

Common Questions About the Junior Solar Sprint

What is the Junior Solar Sprint?

The Junior Solar Sprint is a classroom-based national competition of solar-powered model cars for 6th, 7th and 8th grade students. The best cars from each school compete in a regional competition. A regional competition can consist of a state, school district(s), county(ies), or part of a state (i.e., Southern California). The Sprint is not meant to be a single school activity. All participants work with identical solar panels and motors. Cars are judged on the basis of design and craftsmanship as well as performance.

What is the purpose of the Junior Solar Sprint?

The Junior Solar Sprint is more than just winning a race. It helps to teach principles of renewable energy in an atmosphere that is fun and exciting. Experience from events in previous years demonstrates that it meets its goals of stimulating interest in new technology among young students and encourages them to accept these technologies and incorporate this area in their education, consumer practices and career plans.

Who runs the Junior Solar Sprint?

The Junior Solar Sprint is supported by the U.S. Department of Energy (DOE) and Midwest Research Institute (MRI), Battelle and Bechtel and managed by the National Renewable Energy Laboratory (NREL).

What is a "Host Site?"

A Host Site is the organization/person that plans and organizes a regional Junior Solar Sprint competition. The Host Site responsibilities are inviting schools to participate, distributing materials, finding sponsors, managing accounts payable/accounts receivable, recruiting and training technical as well as race day volunteers, scheduling, and managing race day.

What will I receive from the manager of the Sprint?

NREL will provide written Teacher/Mentor, Student, and Host Guides; race rules; an informational brochure; promotional video; and toll-free support for any question you may have about the Junior Solar Sprint.

When is a Junior Solar Sprint competition successful?

A Sprint is successful when the students, teachers, parents, and volunteers have fun and learn about renewable energy applications. You will know people had fun when they are enthusiastically discussing next year's race immediately following the awards ceremony. The key to having a successful race is **organization**. The success of the event is directly proportional to the time and effort expended organizing the race.

HOST SITE ACTIVITIES TIMELINES

Please remember, these are guidelines, not absolutes. Once you get a feel for what needs to be done, you will be able to judge for yourself how much time you will need to accomplish the tasks at hand. And don't forget to have fun!

September

You will receive a letter from the manager of the Sprint informing you of next year's plans and asking you to return a commitment letter with an estimate of how many kits you will need for your competition.

October/November

Inviting schools

Contact your State Department of Education representatives. They may have mailing addresses and labels you can use to invite the schools with 6th, 7th and 8th grade classes. In addition, ask the Department of Education who the president of your state's science teachers' association is. Contact the president and ask for the editor of the science teachers' newsletter. Call the editor for addresses/contacts; also ask if their publication schedule is timely for your Sprint competition. If so, put an advertisement or article in the newsletter.

Create a cover letter or flyer with an application form that introduces the Junior Solar Sprint. Avoid the temptation to include all your Sprint information in the mailing. You want this first mailing to be informative, simple, and concise, not a bulky package that winds up in the circular file. Decide if you are going to limit the number of teams from each school or if you are going to let them bring as many as they want. This information needs to be clear in your initial mailing. (Appendix A - Sample Introduction letter)

Accounting

Set up your accounting files. Record the contact names and schools. Some sites charge a registration fee to the schools to cover administrative expenses. You are responsible for collecting monies from the schools/students participating in your Sprint.

Planning Committee

You may want to form a Planning Committee to help you with the execution of the Sprint. The Planning Committee would make decisions and schedule parts of the

events such as location of the competition; date of the Sprint; what type of track to use; how many volunteers to use; lunch vs. concessions; photography; public relations; and many other details. If you do not work with a Planning Committee, I strongly suggest enlisting the help of a volunteer coordinator. The coordinator will recruit, schedule, and train your technical and race-day volunteers.

Sponsors

Obtain sponsors for your competition. Sponsors can cover the costs of lunches, t-shirts, awards, printing, race track materials, scoreboard, and help offset other costs of the competition. Remember to get a camera-ready logo from your sponsor for use on the banner, race-day program, and t-shirts. Write thank you letters at the time sponsors give you cash or in-kind donations. (Appendix B - Sample Sponsor Letter)

Select a Race Date and Rain Date

Select a race date and a rain date for late May or early June. Consider the weather in your area. Contact your State Department of Education for information on local school and athletic schedules that may conflict.

Site of Sprint competition

Choose a site that meets this criteria: Hard flat racing surface at least 20 meters by 10 meters with a wide area around the perimeter for race officials and spectators; the site must have 6 to 8 hours of sun with no shady areas; easy access; work areas for students and inspection of cars; parking; eating; restrooms; and the awards ceremony. Visit the race location at the same time of day as the race in order to inspect for shadows, remembering that they will be different in the spring than in the fall. Sites that have been used for competitions: Running tracks, basketball and tennis courts with adjacent grandstands; the top level of a parking garage; parking lots; and open space on college campuses.

December

Mentors for schools

Recruit technical volunteers that will answer questions for the teachers and students and visit the schools during the construction phase. Suggestions for volunteers: your business; local engineering societies such as Society of Automotive Engineers, American Society of Mechanical Engineers, Society of Women Engineers, Society of Hispanic Professional Engineers, etc.; the engineering departments of your local community colleges and universities. If you cannot recruit technical volunteers, you may refer teachers to the 1-800-NEW-ENGY number for help.

Public Relations Plan

You need a plan to ensure adequate press coverage for the race competition. Your packet should include a press release, fact sheet, and photograph/video. Collect names and addresses for the local newspapers of the participants, and don't forget the

small towns of your participants. Look for human interest stories. (Appendix C - Sample Press Release)

January

Distribute materials

Distribute materials. Consider holding an orientation meeting to provide technical guidance to the teachers and students.

Set up times to visit the participating schools beginning in February. Find out the best time to contact the teacher. Do you need to get a home phone number? If you have a large base of volunteers, assign a volunteer to each school for technical support. Our past evaluations have indicated that it is very important to stay in contact with the teachers/students/schools working with this project in case they become discouraged in the process.

Plan the race track using the information provided. (See Track Specifications)

Draft an agenda for race day. (Appendix D Sample Draft Agenda for Race Day)

Lunch

Decide whether or not to provide lunch or concessions during the competition. Questions to ask: Do you want to provide lunch? How long will the competition last? Consider your race location, can participants reach restaurants in a timely manner? Are there picnic tables for participants that bring their own lunches and coolers? Can you raise the money to provide lunch/concessions? Will a sponsor provide lunch?

February

Decide on the timing device. Stop watches? Lane judges?

Begin phone contacts and visits to the participating schools.

Plan your scoreboard, signs, banners, etc. You may want to contact your local vocational technology schools to complete this work. Students work on the graphic design in class; you pay for the supplies. (Remember the logos from your sponsors.) Design and order t-shirts, if appropriate. (Remember to include the logos of all your sponsors!)

Schedule and map out race day. This will be the basis for your race day program.

Plan the times and places for registration for teams and volunteers, inspection, design, race track, the race announcer, public address system, work areas, lunch and eating areas, and the awards ceremony. Calculate the number of volunteers you will need on race day. Decide whom you want to ask to be the moderator and award presenter(s). Who is vivacious and has a good speaking voice? Someone from your office? Local press or celebrity? Invite them to participate.

March

Keep contacting the schools! Evaluations have found that more teams showed up on race day when someone (the technical mentor or someone from the host site) kept in touch with them to see how they were doing and if they needed any questions answered.

Verify that the race site is still available.

Plan construction of the track. (Appendix E - Track Specifications) Some sites have marked off lanes on tennis and basketball courts with masking tape, using cement bricks on top of the plywood used to anchor the guide wire. Other sites using parking lots or sidewalks, marked the lanes with roofing felt (the felt is the correct length and width) if the area was not smooth. As wind can easily get under the roofing paper and lift the track, be sure it is secured on all sides by duct tape. The expense for an 8 lane track of roofing felt, duct tape, plywood and cement blocks runs approximately \$75.00.

Design the race day information, including time schedules participating schools, registration packet, conduct of the race, race format, double elimination, intramural race registration and maps. Mail to schools. If appropriate, include names of local motels/hotels for overnight stays. (Appendix F – Race Day Information)

Make arrangements for a public address system to announce the race heats and keep the competition moving.

April/May/June

Are your mentors still in touch with their schools? Are you?

Media blitz 3 weeks prior to race day.

Test track.

Volunteers

One month prior to race date: recruit and train race day volunteers, race judges, monitors, officials, registration, set-up, and, last but not least, clean-up. (Appendix G – Sample Volunteer Training Materials)

Three weeks prior to the race date:

Have your schools register their winning teams for the competition by supplying you the names of the team members, coach, and name of car (if there is one).

Two weeks - ten days prior to the competition:

Go through your check list to verify what has been done and what still needs to be done.

(Appendix H – Race Day Checklist)

Print the race day programs; (Appendix I – Sample JSS Race Day Program)
duplicate inspection and design forms. (Appendix J – Sample Inspection & Design Form)

Verify lunch orders (if appropriate).

Two days prior to race date:

Make up registration packets. Include: name tags for participants and coaches; race day programs; lunch tickets (if appropriate); heat cards (should you decide to use them).

Race day

Verify your check list one more time.

Set up, host the event, clean up.

Most importantly, have fun! If you do, everyone else will!

Immediately after race day

Send thank you letters to volunteers; thank you letters to the sponsors with a picture or two of the event.

Send evaluation forms to schools. Compile information. (Appendix K – Sample Evaluation Forms)

APPENDIX A - Sample Introduction Letter

February 23, 1993

Dear Educator:

The U.S. Department of Energy (DOE), Midwest Research Institute (MRI) and Science Pioneers invite and encourage your school participation in a Junior Solar Sprint Regional competition in Kansas City on June 19, 1993. This event is part of a National Junior Solar Sprint competition sponsored by DOE, the National Renewable Energy Laboratory, and the Society of Automotive Engineers. In 1992, 16 regional contests were held throughout the nation.

This competition is an opportunity for local seventh and eighth-grade science students to use scientific know-how, creative thinking, experimentation, and teamwork to design and build small, solar-powered model cars. All participants will use a standardized solar cell and motor. With the exception of a few car specification regulations, unlimited ingenuity and inventiveness can be used in car construction. Awards will be given for design in addition to the track event itself.

The attached material provides information on the location, race details, contest rules and construction tips.

In addition to this competition, Sunrayce '93, a biennial intercollegiate solar-car race competition, will be making a mid-day stop in Kansas City on June 23, 1993, at the MRI facility. This 1000-mile race, sponsored by DOE, MRI, the National Renewable Energy Laboratory, and General Motors, will start in Dallas, Texas, on June 20 and finish in Minneapolis, Minnesota, on June 26. Spectators are encouraged to attend this event, and we especially encourage those involved or interested in Junior Solar Sprint to view these "full-size" cars up close.

Both Junior Solar Sprint and Sunrayce '93 are examples of hands-on, multi disciplinary projects that motivate students and illustrates how pursuing careers in the fields of science, math, and engineering can be exciting and highly rewarding particularly when applied to renewable energy sources.

We are proud to host Junior Solar Sprint and hope your school will join us in this unique and fun event. If you have questions, please contact Anne Scheer, Race Coordinator, DOE, at 426-5533.

APPENDIX A - Continued

JUNIOR SOLAR SPRINT REGIONAL

Who, What, AND Where

Sixth, seventh and eighth-grade science classes in the Kansas City area are invited to design, build and race solar-powered model cars. These small model cars – powered entirely by solar energy and guided by wires -- should be built as team efforts under teacher guidance.

Date: June 19, 1993 (rain date June 26, 1993)

Location: University of Missouri-Kansas City
5100 Rockhill Road
Kansas City, Missouri

Race Site at UMKC - Corner of Oak and Cherry

CAR DESIGN AND CONSTRUCTION

A standardized solar car kit (consisting of a solar cell, and motor will be used by all participating teams. Only one entry from a school will be allowed. Schools will determine their entry through their own selection process. Participation will be limited to the first 50 entries received.

RACE DETAILS AND DETERMINATION OF WINNERS

The race length is 20 meters with 1-meter-wide lanes. In order to keep the cars in their assigned lane, a guide wire will be used. An eyelet will be incorporated into the design of each of the participating cars for that wire. Complete rules and design regulations are included with each solar car kit.

The race will be run in heats until the top performing cars are determined. Each car will run in approximately 3-5 heats, depending upon the number of cars, weather conditions, etc. Prizes will be awarded to top performance cars.

The Junior Solar Sprint is both a design and track event. Design awards will be based on technology, craftsmanship, and appearance of the car.

Junior Solar Sprint

Appendix B - Sample Sponsor Letter

September 14, 1994

The U.S. Department of Energy (DOE) and the National Renewable Energy Laboratory (NREL) are pleased to announce the fifth annual Junior Solar Sprint competitions! This national program was developed in 1990 to generate enthusiasm for renewable energy at the middle school level; to improve seventh and eighth grade students' knowledge of these concepts and energy issues; and to encourage young people to consider technical careers. For more than 40 years, DOE and its predecessor agencies have sponsored programs to improve students' knowledge of science, mathematics, energy, and technology. The Junior Solar Sprint is just one of more than 800 DOE programs aimed at preparing students to participate effectively in our growing technology-driven economy. We hope you will consider being a part of this exciting event.

Throughout the Sprint, organizations such as DOE facilities and its contractor laboratories, the Society of Automotive Engineers (SAE), public utilities, and even middle schools themselves host competitions, encouraging students in their communities to rise to the challenge set forth by the Sprint. Last year, more than 60,000 students participated in 47 regional competitions in 25 states. In 1995, we expect to host Junior Solar Sprint competitions in 35 states with more than 75,000 students participating!

We would like to request that Your Sponsor Name partner with DOE and NREL through the donation of t-shirts (hats or lunch or cost of kits or printing or money or other). Approximately _____ students, teachers and competition volunteers will take part in this event, and each will be given a commemorative _____.

The Junior Solar Sprint's corporate sponsors are vital to the success of the competitions and, therefore, are given prominent recognition for their generosity and support. Please take the time to review the enclosed video/materials. We would very much appreciate any support you can provide for the Junior Solar Sprint. I can be reached at your telephone number.

Sincerely,

APPENDIX C - Sample Press Release

For information contact:
Host Site coordinator or
Company Public Relations Office

Where and Date --- Students from 72 Colorado middle schools will bring their ideas for future solar cars to Golden May 15 to compete in the Junior Solar Sprint, a regional model solar car race designed to promote renewable energy education.

"Our goal is to help teachers teach today's youth the scientific and social principles they will need to make decisions about tomorrow's transportation systems," said Linda Lung, race coordinator and education manager for the National Renewable Energy Laboratory (NREL). "Students learn about vehicle design, fuel options, environmental impacts and energy use in an atmosphere of fun and excitement."

Each Junior Solar Sprint team is required to design and build a model car no larger than 30 cm x 60 cm x 30 cm. The cars must be powered by sunlight using a solar photovoltaic cell that converts the sun's energy into electricity. Although the cell and a motor are provided by NREL, students must consider such critical factors as aerodynamic drag, rolling resistance, weight, and drive train when designing their cars for speed and reliability.

The race is a double elimination competition with awards going to the fastest five cars. Awards also will be given for the best five car designs.

The Junior Solar Sprint starts at 10:00 am, Saturday May 15, in the courtyard at the NREL offices, 1617 Cole Boulevard, in the Denver West Office Park in Golden. The awards ceremony will take place at 3 pm.

The competition is sponsored by the U.S. Department of Energy, the Midwest Research Institute of Kansas City, MO and NREL and is endorsed by the National Science Teachers Association. Support also is being provided by the Stevinson Automotive Group, Holiday Inn West, Unique Mobility, Bolle America, Photocomm, Inc., and Warren Occupation Tech Center.

A list of schools participating in the Junior Solar Sprint follows.

(List schools and city they are from. This news release can be sent to the media in your area as well as the media in the area's of the schools that are participating.)

APPENDIX D - Sample Draft Agenda for Race Day

EVENT DAY PROGRAM JUNIOR SOLAR COMPETITION

<u>Time</u>	<u>Event</u>	<u>Location</u>
9:00 am	Registration	Solar Energy Research Facility
9:00 am	Inspection	Solarium Area Solarium Area
9:00 am	Design Categories	Judging Solarium Area
10:45 am	Opening Ceremony	Parking Lot - Stage
	Welcome & Announcements	
	<ul style="list-style-type: none">• Dr. Carol Riordan, Associate Director National Renewable Energy Laboratory	
	Opening Statement	
	<ul style="list-style-type: none">• Julie Baxes	
11:00 am	Race Competition	Parking Lot
12:00-1:00 pm	Lunch	Solarium Area
1:00	Race Competition	Parking Lot
To Be Announced	Final Competition	Parking Lot
To Be Announced	Awards Ceremony	Parking Lot - Stage
	Steve Hauser - Center Director	
	Marketing Partnerships	
	Race Competition	
	Design Competition	

APPENDIX E – Track Specifications

Track Length: 20 meters

Lane Width: 1 meter

Number of Lanes: The number of lanes depends on the total entrants and time available. Each heat takes about 5 minutes. Each car should run at least twice in a double elimination heat format.

Surface: The surface should be as smooth as possible, flat and level or slightly downhill in the direction of the race. The racing surface must be fully exposed to the sun all day. It should be oriented so that prevailing winds are behind the cars. Crosswinds are a real problem. Sweep the track before the race to clear it of any debris.

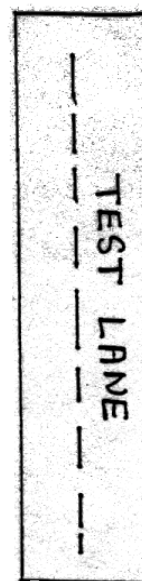
Layout: The guide wires are hard to see. Security roping should be set up around the perimeter to protect the track. A second security roping should be used for team movement and to keep spectators off the track. In addition to the racing surface, there must be a staging area near the starting line and a run-off area beyond the finish line. A “pit” area is needed for “tune-ups” between races. The pit area should have two practice guide lines. (See Lane Set Up)

Guide Lines: 40- to 60-pound test monofilament fishing line is adequate. The line should be suspended about 1 cm. (+/- .5 cm) off the ground. (See Guide Wire) for suggested mounting. The lines must be kept guitar-string taut.

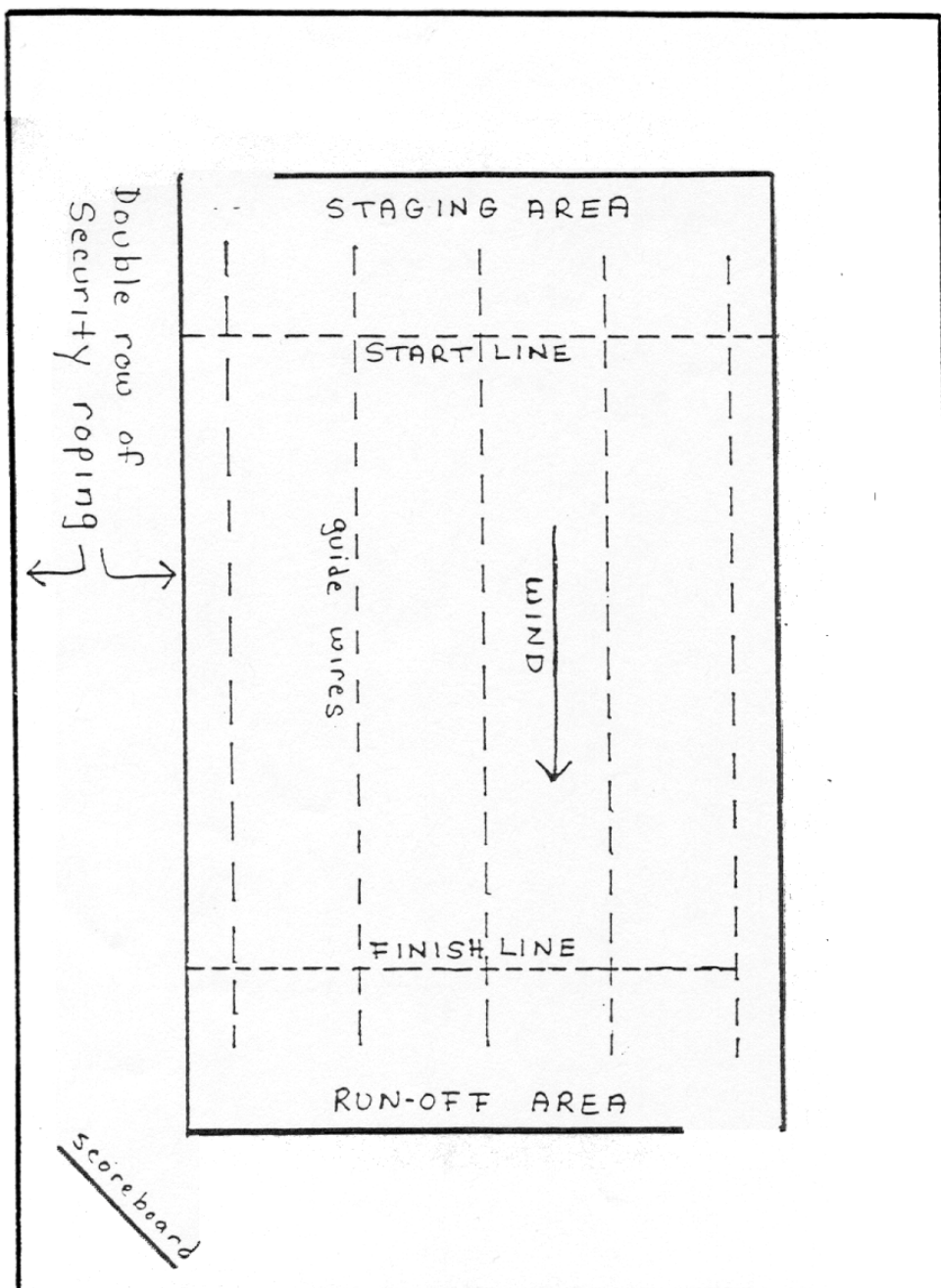
Timer: Some method is needed to determine the placement of cars at the finish line. Finish line judges may use a timing device. The timer need not measure speed but must be able to determine each car’s place.

Communication: Efficient communication is needed between the starting line, the finish line and the scoreboard. A loudspeaker or bullhorn is helpful for public announcements and crowd control.

Lane Set Up



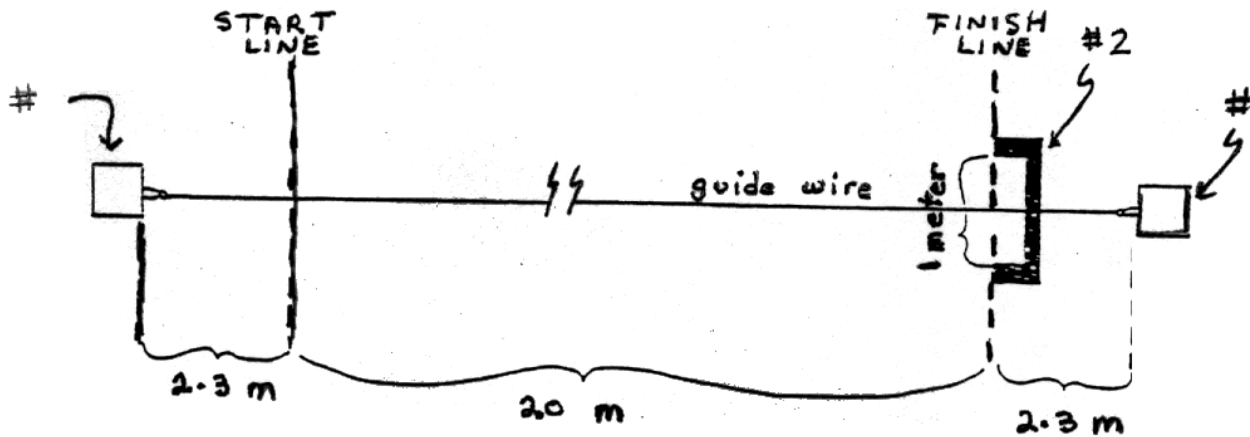
Spectators



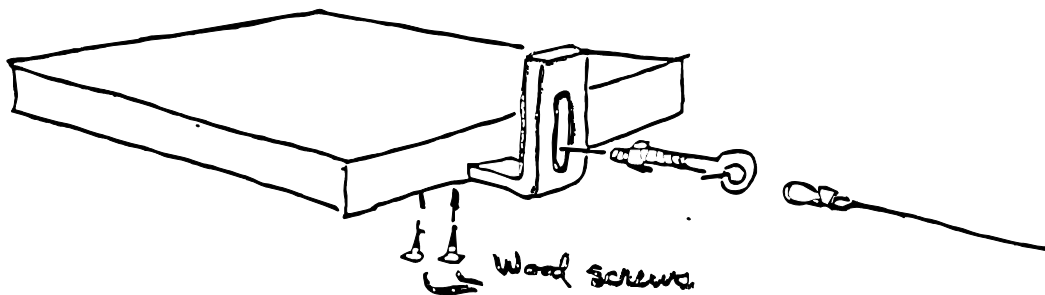
APPENDIX E (Con't)

Guide Wire Track Specifications

One lane with a timing device viewed from above:



Detail of anchor (parts #1 in above diagram) for guide wire:



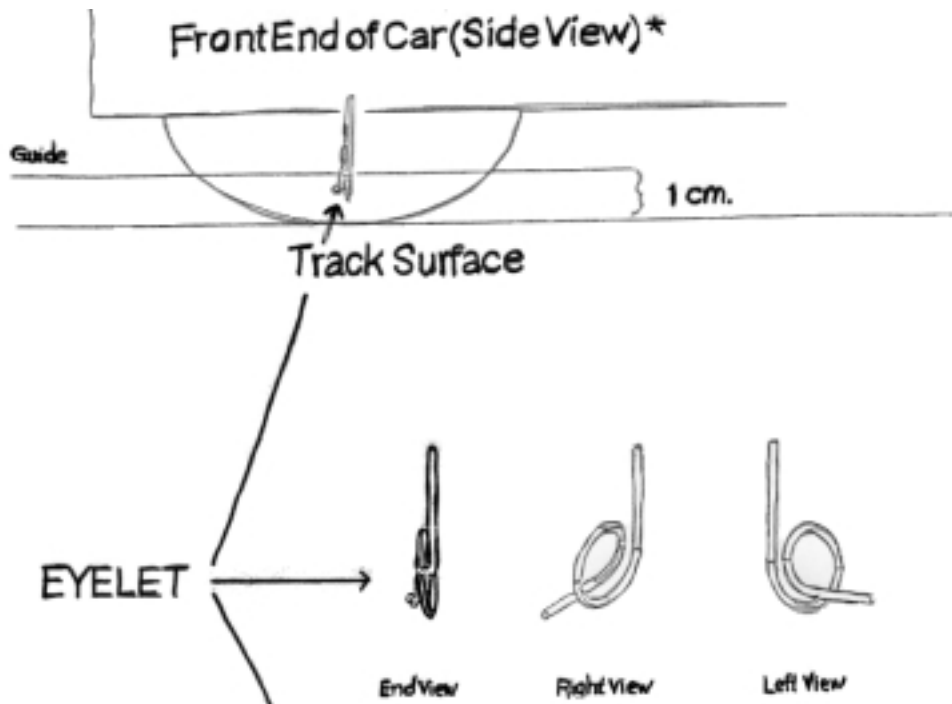
A 12' x 12" piece of $\frac{3}{4}$ " plywood was used to anchor both ends of the guide wire. A corner-reinforcing bracket was slotted to accept a threaded eyebolt to allow for height adjustment of the guide wire. The plywood was chiseled out on the bottom to accept the bracket.

The guide wires were pre-measured and attached to the eyebolts with clips. The clips were purchased at a fishing tackle store as was the 40# monofilament line used for the guide wire.

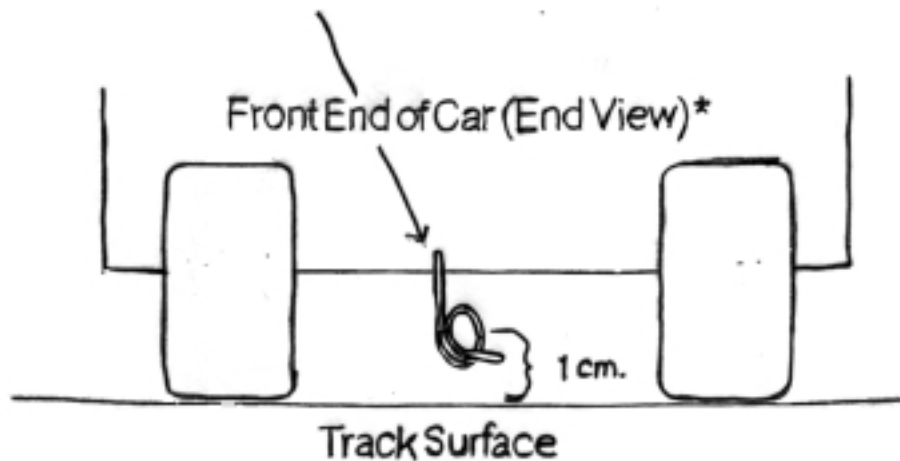
Once assembled, the plywood was anchored with 40 pounds of ballast and moved apart to give the desired line tension.

APPENDIX E (con't)

Note: Make sure that your car tracks in a straight line.



Construct the eyelet of 18-gauge wire. Embed it in the bottom of your car near the front (or near the front and rear). The guide wire will pass through the eyelet to keep your car in its lane.



*Eyelets may be mounted at the front end or both ends

APPENDIX F – Race Day Information

NOTE: The following pages refer to NREL's Junior Solar Sprint Competition

COUNTDOWN TO THE JUNIOR SOLAR SPRINT FOR STUDENTS AND TEACHERS

- FEB. /MAR** Receive race information/student packets/solar car kits
Design solar-powered cars
- MARCH** Start solar-powered cars
Plan intramural race
- APRIL** Conduct intramural race to determine school's entry to the regional race (last part of April)
Notify NREL of winning entry by May 1, 1994
- MAY 14** Winner of intramural race competes in Junior Solar Sprint regional race
Race Information
Track Orientation: The track will be positioned from West (starting line) to East (finish line).
Race Time (sunlight consideration): The cars will be racing between 11:00 a.m. to 3:00 p.m.
Track Composition:
Overnight Accommodations (if needed for Friday night):
- Day's Inn: 15059 W. Colfax, Golden 277-0200
 - Holiday Inn: 14707 W. Colfax, Golden 279-7611
 - Chalet Motel: 6051 W. Alameda Ave., Lakewood 237-7775
 - East Tin Cup Village Camper Park: 17921 W. Colfax Ave., Golden 279-6279
 - Marriott Hotel: I-70 at Exit 263, Golden 279-9100
 - Pleasant Valley Motel: 975 Indiana, Golden
 - Mountain View Motel: 14825 W. Colfax Ave., Golden 279-2526
 - Ace's Motel: 17250 W. Colfax Ave., Golden 277-1122
 - Table Mountain Inn: 1310 Washington, Golden 277-9898
 - La Quinta: 3301 Youngfield Service Road, Golden 279-5565
 - Motel 6: I-70 & Kipling, Wheat Ridge 467-3172
 - Golden Motel: 24 & Ford, Golden 279-5581
 - The Homestead Motel: 8837 W. Colfax, Lakewood 232-8837
 - Stonewall Motel: 12111 W. Colfax Ave., Lakewood 239-6418
- MAY 15** Rain day

PARTICIPATING SCHOOLS

Below are the names and the team numbers of the competing schools:

Team 1: Virtus Banowetz Agate School 41032 Second Ave. P.O. Box 118 Agate, CO 80101	Team 10: Alison Tyler Bell Middle School 1001 Ulysses St. Golden, CO 80401	Team 19: Ron Howard Bennett Middle School 510 7th St. Bennett, CO 80102
Team 2: John Fabian Jr. Beulah Middle School 8734 School House Lane Beulah, CO 81023	Team 11: Mr. Tanaka Cedaredge Middle School 360 North Grand Mesa Dr. Cedaredge, CO 81413	Team 20: Jay Donaghy Centennial Middle School 2205 Norwood Boulder, CO 80304
Team 3: Karen Scott Byers Jr. High School 440 Main St., P.O. Box 420 Byers, CO 80103	Team 12: Del Birk Eagle Valley Middle School P.O. Box 1019 Eagle, CO 81631	Team 21: Kevin LaBella Eagleview Middle School 1325 Vindicator Drive Colorado Springs, CO 809
Team 4: Anne Wright Dolores Middle School P.O. Box 757 Dolores, CO 81323	Team 13: Terry Henderson Ellicott Jr/Sr High School 375 S. Ellicott Hwy. Calhan, CO 80808	Team 22: Ray Burden Joanna Clapham Evergreen Jr. High School 2052 Colorado Hwy 74 Evergreen, CO 80439
Team 5: Jill Parker Elizabeth Middle School P.O. Box 369 Elizabeth, CO 80107	Team 14: Neil Nelson Janitell Jr. High School 7635 Fountain Mesa Rd. Fountain, CO 80817	Team 23: Tim Hogan Kit Carson R-1 Schools 102 5th Ave. P.O. Box 18 Kit Carson, CO 80825
Team 6: Peg Engram Irving Jr. High School 1702 N. Murray Blvd. Colorado Springs, CO 80915	Team 15: Dale A. Kraemer Miller Middle School Junction Creek Road Durango, CO 81301	Team 24: Todd Huck Minturn Middle School 1951 So. Hwy 24, P.O. Bo Minturn, CO 81645
Team 7: Don O'Brian Maplewood Middle School 1201 21st Ave. Greeley, CO 80631	Team 16: Scott Sanders Revere Jr/Sr High School 300 Morgan Ovid, CO 80744	Team 25: Kent Kast Seventh-day Adventist Ch Academy 5410 Palmer Park Blvd. Colorado Springs, CO 809
Team 8: Connie Henderson Prairie School P.O. Box 68 New Raymer, CO 80142	Team 17: Ken Widel University Lab School University Northern Colorado Greeley, CO 80639	Team 26: Mike O'Hotto West Grand Middle School PO. Box 515 Kremmling, CO 80459
Team 9: Ron Barela Aguilar Jr/Sr High School P.O. Box 567 Aguilar, CO 81020	Team 18: Mark A. Steward Akron Junior High 251 E. 5th Akron, CO 80720	Team 27: Kenn Estes Aragon Middle School 211 S. Main Fountain, CO 80817

Team 28: Bryce Monasmi Bethune Jr/Sr High School 145 W. 3rd St., P.O. Box 1 Bethune, CO 80805	Team 37: Lisa McGrath Deer Creek Middle School 9201 W. Columbine Littleton, CO 80123	Team 46: David Erwin Elbert Jr/Sr High School P.O. Box 38 Elbert, CO 80106
Team 29: Twila Geroux Custer County School P.O. Box 730 Westcliffe, CO 81252-0730	Team 38: Dan Rosen East Middle School 830 Gunnison Ave. Grand Junction, CO 81501	Team 47: Louise Belnay Rebecca Marques Hodgkins Middle School 3475 W. 67th So Denver, CO 80021
Team 30: John G. Young East Grand Middle School 1197 West Diamond P.O. Box 2210 Granby, CO 80446	Team 39: Greg Richards Hayden Middle School P.O. Box 70 Hayden, CO 81639	Team 48: Lars Peterson Louisville Middle School 1341 Main St. Louisville, CO 80027
Team 31: Rich Sumpter Haxtun Jr. High School P.O. Box 548 Haxtun, CO 80731	Team 40: Barb Sharshel Las Animans Middle School 1214 Thompson Blvd. Las Animas, CO 81054	Team 49: Eric Fagrelus Ouray Middle School P.O. Box N Ouray, CO 81427
Team 32: Sam Grimsley Joy Klein La Junta Middle School 9th & Smithland La Junta, CO 81050	Team 41: Steve Slater Northglenn Jr. High School 1123 Muriel Dr. Northglenn, CO 80233	Team 50: Rob Berlinski Aurora Hills Middle School 1009 S. Uvalda Aurora, CO 80012
Team 33: Lee Wadleigh Nevin Platt Middle School 6096 Baseline Road Boulder, CO 80303	Team 42: Marsha Corey Southern Hills Middle School 1500 Knox Dr. Boulder, CO 80303	Team 51: Cynthia Wilbur Wheat Ridge Middle Schoo 7101 W. 38th Avenue Wheat Ridge, CO 80033
Team 34: Carolyn Rudy Sinclair Middle School 300 W. Chenango Englewood, CO 80110	Team 43: Larry Kilgore Westview Middle School 1651 Airport Road Longmont, CO 80503	Team 52: Richard O'Conner Central Lakewood ADT 1005 N Wadsworth Lakewood, CO 80215
Team 35: Mike Waldvogle West Jefferson Jr. High 9449 So. Barnes Ave. Conifer, CO 80433	Team 44: Thomas Smith Boltz Jr. High School 720 Boltz Drive Fort Collins, CO 80525	Team 53: Dick Miller Faith Christian Academy 6210 Ward Road Arvada, CO 80004
Team 36: Fran Golding Big Sandy School 609 Pueblo St., P.O. Box 68 Simla, CO 80808	Team 45: Pam Cobb Divine Redeemer 901 N. Logan Colorado Springs, CO 80909	Team 54: Michael Thornto Community Christian Scho 2306 E Empire Cortez, CO 81321

Team 55: Ken Cressy/Lind
North Middle School
12095 Montview Blvd
Aurora, CO 80010-1608

Registration packet for the Colorado Junior Solar Sprint Competition

Please complete attached forms and Fax, E-mail or Mail to Linda Lung:

Fax #: 303-275-3076

E-mail: linda_lung @nrel.gov

Mail: National Renewable Energy Laboratory (NREL)

Linda Lung

1617 Cole Blvd., Building 17

Golden, CO 80401-3393

The Registration Packet includes:

- Letter – Dear Junior Solar Sprint Coaches
- Team Registration Form
- Parental Consent Form
- Student Medical Form
- Coaches Medical Form
- Photo Release Form – Student
- Photo Release Form – Coach
- JSS Race Rules (2 pages)
- Tentative Agenda for May 13th
- Directions and Map

Any questions call Linda Lung at 303-275-3044



National Renewable Energy Laboratory

Letter to Coaches

March 13, 2000

Dear Junior Solar Sprint Coaches:

The 2000 Junior Solar Sprint (JSS) is scheduled for May 13, 2000 at the Solar Energy Research Facility (SERF) at the National Renewable Energy Laboratory (NREL) in Golden. Registration will begin at **9:00 a.m.** on May 13th.

Enclosed are the required registration forms to be completed and returned to NREL by Monday, May 1, 2000.

Enclosures:

- Team Registration Form
- Parental Consent Form
- Student Form
- Coach Medical Form
- Release for Photography (Adult and Minor)
- JSS Rules (*Please disregard the rules included in the PITSCO Sun Sprint kits they are not appropriate for the Colorado JSS.*)
- Tentative Agenda for May 13th
- Map and directions to NREL

Reminders:

- A JSS Team is comprised of up to 4 students and one coach. Each school can register up to two teams
- Solar panels and motors from 1996, 1998 and 1999 can be used in the 2000 JSS. Cars with panels and motors prior to 1996 will not be accepted.
- Lunches and t-shirts will be provided for each team member and coach listed on the registration form.

If you need assistance in building a model solar car, please visit the JSS web site to download JSS support material, <http://www.nrel.gov/education/natjss.html>.

If you want to get some ideas from last year's winning cars check out <http://www.nrel.gov/education/cojss.html>

Good luck and I look forward to seeing you on May 13th.

Best Regards,

Linda Lung
Education Programs
Tel: (303) 275-3044
Fax: (303) 275-3076
E-mail: Linda_lung@nrel.gov

Enclosures

2000 Colorado Junior Solar Sprint Team Registration Form

(Please Type or Print Clearly)

SCHOOL _____ Telephone _____ Principal _____

SCHOOL ADDRESS _____

SCHOOL FAX# _____

SOLAR CAR NAME _____

TEAM MEMBERS:

1. Name _____ (Nickname) _____ DOB _____
Address _____ City _____ State _____ ZIP _____
Home Phone _____ Grade _____ Sex: M F Citizenship: U.S. _____ Other _____

2. Name _____ (Nickname) _____ DOB _____
Address _____ City _____ State _____ ZIP _____
Home Phone _____ Grade _____ Sex: M F Citizenship: U.S. _____ Other _____

3. Name _____ (Nickname) _____ DOB _____
Address _____ City _____ State _____ ZIP _____
Home Phone _____ Grade _____ Sex: M F Citizenship: U.S. _____ Other _____

4. Name _____ (Nickname) _____ DOB _____
Address _____ City _____ State _____ ZIP _____
Home Phone _____ Grade _____ Sex: M F Citizenship: U.S. _____ Other _____

COACH:

Name _____ (Nickname) _____ DOB _____
Address _____ City _____ State _____ ZIP _____
Home Phone _____ Grade _____ Sex: M F Citizenship: U.S. _____ Other _____
E-mail address _____

Coaches Signature _____

Local Newspaper _____ Newspaper Phone _____

**ONLY THOSE STUDENTS LISTED ABOVE ARE ELIGIBLE TO COMPETE ON YOUR
SCHOOL'S TEAM**

Schools can register up to two teams.

**U.S. Department of Energy's (DOE)
National Renewable Energy Laboratory
2000 Colorado Junior Solar Sprint**

Parental Consent for Student Participation

I, (Mr., Mrs., Ms.)_ _____, the legal guardian of _____, give my consent for him/her to participate in all activities associated with the Department of Energy's National Renewable Energy Laboratory's 2000 Junior Solar Sprint.

I understand that this will include participating in events and activities related to the U.S. Department of Energy's National Renewable Energy Laboratory's 2000 Junior Solar Sprint and will include travel under the supervision of the team coach.

Waiver of Liability

I hereby release and discharge the Department of Energy, the United States Government, and the National Renewable Energy Laboratory, Midwest Research Institute, Battelle and Bechtel, their officers, agents, servants, and employees, and persons, firms or corporations contracting with, or acting on behalf of, the Department of Energy or the United States Government with respect to the activities of the 2000 Junior Solar Sprint, as any cause of action of any nature whatsoever arising from my child's participation in the activities of the Department of Energy's National Renewable Energy Laboratory's 2000 Junior Solar Sprint.

Signature of Parent (either Father or Mother)

Signature of Legal Guardian

Signature of Participating Student

Date

Junior Solar Sprint

Student Medical Form

NATIONAL RENEWABLE ENERGY LABORATORY STUDENT MEDICAL FORM

(Confidential Medical Information and Emergency Notification Form)

STUDENT INFORMATION

Name _____ Birthdate _____ Sex: M F

Street Address _____

City _____ State _____ Zip Code _____

Date of Last Tetanus Shot _____ Drug Allergies _____

Physician _____ Physician's Phone _____

Medical Conditions or Previous Surgery _____

Regular Medications _____

Special Dietary Requirements (include food allergies) _____

Special Physical Needs _____

FAMILY INFORMATION

Father's Name _____ Work Phone _____

Mother's Name _____ Work Phone _____

Legal Guardian (if applicable) _____ Work Phone _____

Emergency Contact _____ Phone _____

Relationship to Student _____

Medical/Hospital _____

Medical/Hospital _____

Insurance Carrier _____ Policy# _____

CONSENT TO MEDICAL CARE AND TREATMENT

(Parental consent is required before a hospital's emergency department can give medical treatment to a minor. Every effort will be made to contact parents or legal guardian, but a completed consent form will expedite treatment)

I hereby authorize and consent to the administration of all medical and/or surgical treatment(s) to my child by a licensed physician or hospital in the event I am not available to consult with the attending physician(s), attempts to contact me have been unsuccessful, and the attending physician(s) deem it advisable to proceed with such treatment(s).

Signature of Parent or Legal Guardian

Date

Junior Solar Sprint

NATIONAL RENEWABLE ENERGY LABORATORY COACH MEDICAL FORM

(Confidential Medical Information and Emergency Notification Form)

COACH INFORMATION

Name _____ Birthdate _____ Sex: M F
Street Address _____
City _____ State _____ Zip Code _____
Home Telephone _____

Date of Last Tetanus Shot _____ Drug Allergies _____
Physician _____ Physician's Phone _____
Medical Conditions or Previous Surgery _____
Regular Medications _____
Special Dietary Requirements (include food allergies) _____
Special Physical Needs _____

EMERGENCY FORMATION

Emergency Contact _____ Phone _____
Relationship to Coach _____
Medical/Hospital _____
Insurance Carrier _____ Policy# _____

CONSENT TO MEDICAL CARE AND TREATMENT

I hereby authorize and consent to the administration of all medical and/or surgical treatment(s) to me by a licensed physician or hospital in the event I am not available to consult with the attending physician(s), attempts to contact me have been unsuccessful, and the attending physician(s) deem it advisable to proceed with such treatment(s).

Signature of Coach

Date

Junior Solar Sprint

PHOTO RELEASE FORM – STUDENT JUNIOR SOLAR SPRINT

The U.S. Department of Energy's National Renewable Energy Laboratory (NREL) undertakes national and local programs in education and participates in activities such as the Junior Solar Sprint.

In carrying out these programs, participants are often photographed, filmed, videotaped or otherwise recorded to illustrate the kind of activities being administered at NREL. You, _____ may be photographed, filmed, videotaped or otherwise recorded during participation at the Junior Solar Sprint, and we desire your permission to use any images or recording taken at this time to promote our training and educational programs and other activities. Any such image or recording may be included in such promotion materials as brochures, booklets, videotapes, reports, press releases, and exhibits. If you agree to the use of any such image or recording, please sign the RELEASE FORM below and return it to:

National Renewable Energy Laboratory
Education Programs
1617 Cole Blvd.
Golden, CO 80401
ATTN: Linda Lung
FAX: 303-275-3076

PHOTO RELEASE FORM - STUDENT

To promote, evaluate, or otherwise describe NREL educational programs and activities, I give permission to NREL, and its agents, to use in connection with any publication (including but not limited to brochures, booklets, videotapes, reports, press releases, and exhibits) any image or recording in which _____, a minor, appears, to use and cite any comment(s), verbal or written, made by said minor about any NREL Program, and to use said minor's name in connection with any publication and in such manner as determined by NREL.

Signed: _____

Parent{ } Guardian { }

Date: _____

Junior Solar Sprint

PHOTO RELEASE FORM – COACH JUNIOR SOLAR SPRINT

The U.S. Department of Energy's National Renewable Energy Laboratory (NREL) undertakes national and local programs in education and participates in activities such as the Junior Solar Sprint.

In carrying out these programs, participants are often photographed, filmed, videotaped or otherwise recorded to illustrate the kind of activities being administered at NREL. You, _____ may be photographed, filmed, videotaped or otherwise recorded during participation at the Junior Solar Sprint, and we desire your permission to use any images or recording taken at this time to promote our training and educational programs and other activities. Any such image or recording may be included in such promotion materials as brochures, booklets, videotapes, reports, press releases, and exhibits. If you agree to the use of any such image or recording, please sign the RELEASE FORM below and return it to:

National Renewable Energy Laboratory
Education Programs
1617 Cole Blvd.
Golden, CO 80401
ATTN: Linda Lung
FAX: 303-275-3076

PHOTO RELEASE FORM - COACH

To promote, evaluate, or otherwise describe NREL educational programs and activities, I give permission to NREL, and its agents, to use in connection with any publication (including but not limited to brochures, booklets, videotapes, reports, press releases, and exhibits) any image or recording in which _____, a minor, appears, to use and cite any comment(s), verbal or written, made by said minor about any NREL Program, and to use said minor's name in connection with any publication and in such manner as determined by NREL.

Signed: _____

Date: _____

2000 JUNIOR SOLAR SPRINT *RACE RULES* AND VEHICLE SPECIFICATIONS

The object of the 2000 Junior Solar Sprint competition is to design and build a vehicle that will complete a race in the shortest possible time using the available power.

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 is the top finisher in a series of head-to-head elimination rounds.

NOTE: All JSS cars must be built by the student with limited assistance from the coach or other adults. **This is a student competition!**

Materials:

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

Vehicle Specifications:

1. The vehicle must be safe to contestants and spectators, e.g., no sharp edges, projectiles, etc.
2. The vehicle must fit the following dimensions: 30 cm. By 60 cm. By 30 cm.
3. Decals of the sponsor organizations (provided by JSS) must be visible from the side on the body of the car. A 3 cm. By 3-cm. Space must be left for the assigned car number.
4. The sun's light is the only energy source that may be used to power the vehicle. No other batteries or energy storage devices are permitted.
5. Any energy-enhancing devices, like mirrors, must be attached to the vehicle.
6. The vehicle must be steered by the guide wire using one or more eyelets affixed to the vehicle. The vehicle must be easily removable from the guide wire, without disconnecting the guide wire.
7. The body of the car must be three-dimensional. **Teams will NOT be allowed to bolt the axles and wheels to the solar cell.** The solar cell cannot be used as the body of the car.

Track Specifications:

1. The length of the racecourse is 20 meters over flat terrain.
2. Race lanes are at least 60 cm. Wide.
3. 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.
4. The track is a hard, flat smooth surface such as a tennis court or running track. A large sheet of rolled material, i.e., plastic, heavy paper, or roll roofing (half-lap), or hardwood taped or bolted together may be used to cover an unsuitable surface.

Conduct of the Race:

1. 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, but not touching the solar panel. The opaque sheet will be removed at the start of the race, allowing the vehicle to collect solar power and start driving.
2. 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.
3. All vehicles will be started when the official signal is given. The winner of the heat will be the first vehicle to cross the finish line or the farthest car down the lane.
4. During the initial heats, the judges may declare multiple wins or losses.
5. One team member must wait at the finish line to catch the vehicle.
6. 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.
7. The vehicle and team member must remain at the finish line until the order of the race has been established.
8. Lane changing or crossing will result in disqualification. (At the discretion of the judges).
9. Challenges must be made before the race judges begin the next heat. All challenges must come from the team members who are actively competing. The decisions of the race judges are final.
10. Judges have the option to inspect cars prior to the final heat or at anytime during/after heats.

Awards:

1. The top performing car(s) from each individual school will advance to the Colorado Junior Solar Sprint competition, held at the National Renewable Energy Laboratory. The car may be selected by time trials, intramural races or at the discretion of the teacher/principal.
2. Awards at the Colorado competition will be given for the five fastest cars and for the five best design vehicles including technical merit, craftsmanship and innovation.

Tentative Agenda

2000 Colorado Junior Solar Sprint
National Renewable Energy Laboratory
May 13, 2000
Tentative Agenda

<u>Time</u>	<u>Event</u>	<u>Location</u>
9:00 am	Registration	Solar Energy Research Facility – Solarium Area
9:00 am	Inspection	Solarium Area
9:00 am	Design Categories Judging	Solarium Area
9:00 am	Team Photos	Entrance – SERF
10:45 am	Opening Ceremony	Parking Lot – Stage
	Welcome & Announcements	
	<ul style="list-style-type: none">David Ginley, Physics Scientist National Renewable Energy Laboratory	
	Opening Statement	
	<ul style="list-style-type: none">Linda Lung, Education Programs National Renewable Energy Laboratory	
11:00 am	Race Competition	Parking Lot
12:00-1:00 pm	Lunch	Solarium Area
1:00 pm	Race Competition	Parking Lot
To Be Announced	Final Competition	Parking Lot
To Be Announced	Awards Ceremony Andy Sulkko, Product Manager, Renewable Energy Trust and Wind Source Public Service Company	
	<ul style="list-style-type: none">Race CompetitionDesign Competition	

Directions to – Solar Energy Research Facility (SERF) at NREL

From Downtown Denver (approximately 12 miles):

Take 1-25 North to 1-70 West. Take 1-70 West to Denver West Boulevard (Exit 263) and at the end of the exit ramp turn right. Immediately get in the far left, and turn left at the stop sign (Denver West Parkway). Pass through the stop sign. Go for ¼ mile and check in at the Site Entrance Building (on your left) for access approval for the Junior Solar Sprint Competition.

From the West:

Going west on I-70, exit Denver West Boulevard (Exit 263).

At the top of the exit ramp turn right. Immediately get in the far-left lane, and turn left at the stop sign (Denver West Parkway). Pass through the next stop sign. Go for ¼ mile and check in at the Site Entrance Building (on your left) for access approval for the Junior Solar Sprint Competition.

From the East:

Going east on 1-70, exit Denver West Boulevard (Exit 263).

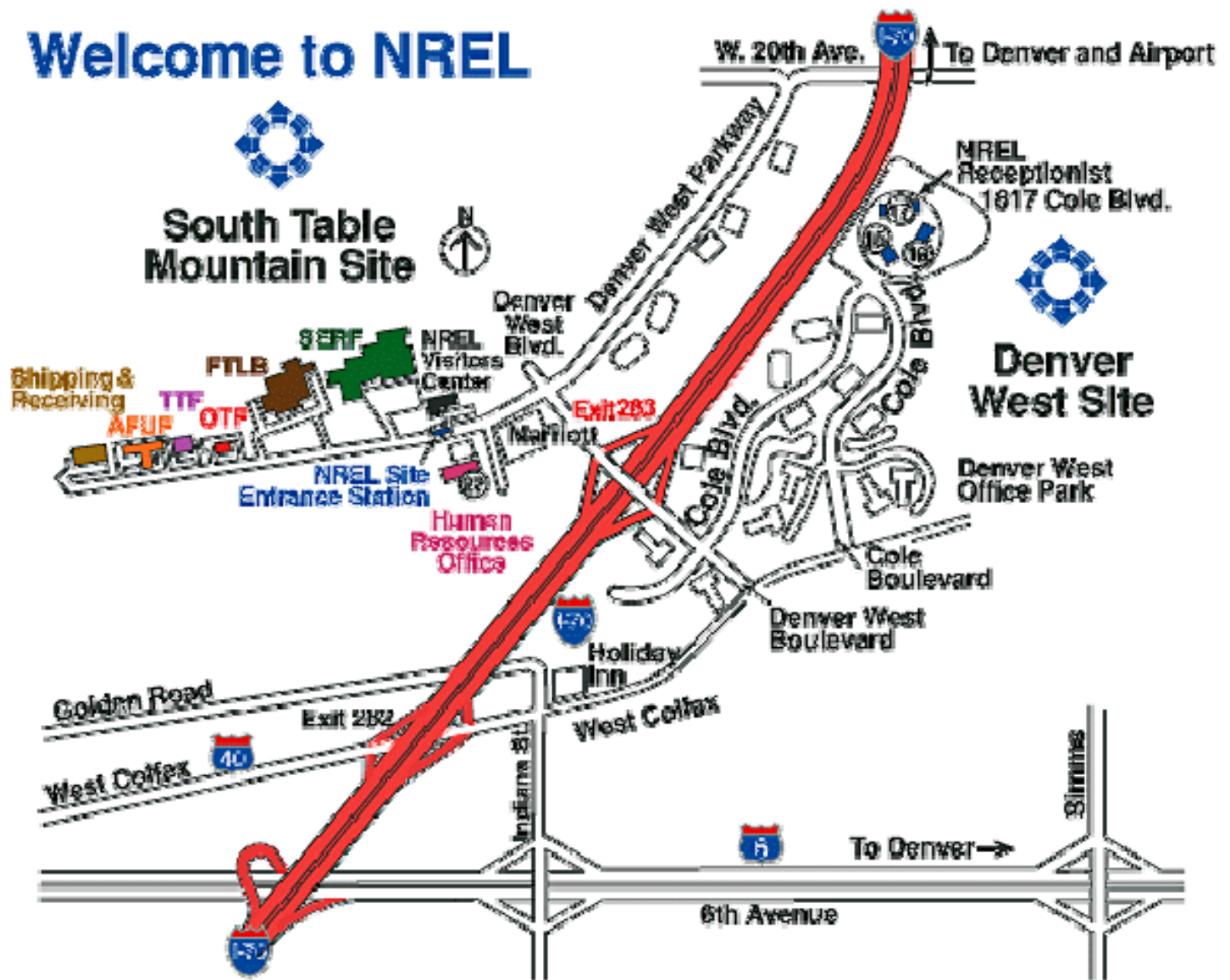
At the top of the exit ramp turn left. Cross over the highway and stay in the far-left lane. Turn left at the stop sign (Denver West Parkway). Pass through the stop sign. Go for ¼ mile and check in at the Site Entrance Building (on your left) for access approval for the Junior Solar Sprint Competition.

From the South:

If you are coming from the southern portion of the state, take I-25 north to C470 heading to I-70, take I-70 exit heading east. Exit Denver West Boulevard (Exit 263). At the top of the exit ramp turn left. Cross over the highway and stay in the far-left lane. Turn left at the stop sign (Denver West Parkway). Pass through the stop sign. Go for ¼ mile and check in at the Site Entrance Building (on your left) for access approval for the Junior Solar Sprint Competition.



Welcome to NREL



CONDUCT OF THE RACE

The race length is 20 meters with 1 meter wide lanes. The track is a hard, flat, smooth surface such as a tennis court.

To start, one team member will hold a cardboard sheet over the solar panel and then uncover the panel when the start signal is given. False starts may result in disqualification from the heat. One team member must wait at the finish line to catch the car to prevent damage to it.

Team members may not accompany the car in its lane during the race. However, one team member may free the car from wire binding or track imperfections. (S)he may also make repairs if a mechanical or an electrical failure, such as a loose power wire, occurs. Team members may not push the car or give any other physical assistance. They may not change the car's mechanical/electrical characteristics (e.g. shift a transmission) after the start of the heat. Physical assistance, unauthorized repair, unauthorized people in the lane or unsportsmanlike conduct will result in disqualification from the heat, as determined by Race Officials.

One team member must be present at the Finish Line to stop the car. The car must remain in its lane at the Finish Line until the order of the cars has been established. Teams that leave the Finish Line prematurely or miss subsequent heats may be disqualified.

DETERMINATION OF WINNERS/PENALTIES

The Junior Solar Sprint is both a design and a performance event. Five design awards will be given to cars based on the following criteria: chassis; transmission; solar array; appearance; craftsmanship; and innovation.

The Junior Solar Sprint will be run in heats. The number of heats will be determined locally depending on the total number of cars, weather conditions, etc. A car will race until it accumulates two losses. Heats will continue until the top five performing cars are determined.

RACE FORMAT

There are a variety of race formats available. Any one may be used that includes:

1. At least a double elimination (two losses) before a car no longer races.
2. Lane changes so that a vehicle does not consistently race in the same lane.
3. Mixing of the cars so that they do not race against the same cars every race.

A sample of a Double Elimination Format is included.

This format uses a win/lose method. A finish-line official identifies the first one or two cars across the finish-line. If resources permit, a simple timing device will be used to identify the placement of the cars at the finish-line.

Race 1		Race 2 One Loss	Race 3 No Loss	Race 4 One Loss	Sponso r's Race	Race 5 Final Heat 20
11:00 am - Heat 1 Lane A - #1 - Agate School Lane B - #2 - Beulah Middle School Lane C - #3 - Byers Jr. High School Lane D - #4 - Dolores Middle School Lane E - #5 - Elizabeth Middle School Lane F - #6 - Irving Jr. High School Lane G - #7 - Maplewood Middle School Lane H - #8 - Prairie School Lane I - #9 - Aguilar Jr/Sr High School Lane J -	11:50 am - Heat 6 Lane A - #46 - Elbert Jr/Sr High Lane B - #47 - Hodgkins Middle Lane C - #48 - Louisville Middle Lane D - #49 - Ouray Middle Lane E - #50 - Aurora Hill Middle Lane F - #51 - Wheat Ridge Middle Lane G - #52 - Central Lakewood Lane H - #53 - Faith Christian Lane I - #54 - Community Christian Lane J - #55 - North Middle School 12:20 pm	Heat 9 Lane A Lane B Lane C Lane D Lane E Lane F Lane G Lane H Lane I Lane J			- 2:10 Lane A Lane B Lane C Lane D Lane E Lane F Lane G Lane H Lane I Lane J	2:20 Lane A Lane B Lane C Lane D Lane E Lane F Lane G Lane H Lane I Lane J
11:10 am - Heat 2 Lane A - #10 - Bell Middle School Lane B - #11 - Cedaredge Middle School Lane C - #12 - Eagle Valley Middle Lane D - #13 - Ellicott Jr/Sr High Lane E - #14 - Janitell Jr High Lane F - #15 - Miller Middle School Lane G - #16 - Revere Jr/Sr High Lane H - #17 - University Lab School Lane I - #18 - Akron Junior High Lane J -		12:30 pm - Heat 10 Lane A Lane B Lane C Lane D Lane E Lane F Lane G Lane H Lane I Lane J	1:20 pm - Heat 15 Lane A Lane B Lane C Lane D Lane E Lane F Lane G Lane H Lane I Lane J	1:40 pm - Heat 17 Lane A Lane B Lane C Lane D Lane E Lane F Lane G Lane H Lane I Lane J		
11:20 am - Heat 3 Lane A - #19 - Bennett Middle School Lane B - #20 - Centennial Middle School Lane C - #21 - Eagleview Middle School Lane D - #22 - Evergreen Jr High School Lane E - #23 - Kit Carson Lane F - #24 - Minturn Middle School Lane G - #25 - Seventh-day Adventist Lane H - #26 - West Grand Middle Lane I - #27 - Aragon Middle School Lane J -		12:40 pm - Heat 11 Lane A Lane B Lane C Lane D Lane E Lane F Lane G Lane H Lane I Lane J	1:30 pm - Heat 16 Lane A Lane B Lane C Lane D Lane E Lane F Lane G Lane H Lane I Lane J	1:50 pm - Heat 18 Lane A Lane B Lane C Lane D Lane E Lane F Lane G Lane H Lane I Lane J		

11:30 am - Heat 4 Lane A - #28 - Bethune Jr/Sr High Lane B - #29 - Custer County School Lane C - #30 - East Grand Middle Lane D - #31 - Haxtun Jr High School Lane E - #32 - La Junta Middle School Lane F - #33 - Nevin Platt Middle School Lane G - #34 - Sinclair Middle School Lane H - #35 - West Jefferson Jr High Lane I - #36 - Big Sandy School Lane J -		12:50 pm - Heat 12 Lane A Lane B Lane C Lane D Lane E Lane F Lane G Lane H Lane I Lane J		2:00 pm - Heat 19 Lane A Lane B Lane C Lane D Lane E Lane F Lane G Lane H Lane I Lane J		
11:40 am - Heat 5 Lane A - #37 - Deer Creek Middle Lane B - #38 - East Middle School Lane C - #39 - Hayden Middle School Lane D - #40 - Las Animas Middle Lane E - #41 - Northglenn Jr High Lane F - #42 - Southern Hills Middle Lane G - #43 - Westview Middle Lane H - #44 - Boltz Junior High Lane I - #45 - Divine Redeemer Lane J - #56 - Cresthill Middle		1:00 pm - Heat 13 Lane A Lane B Lane C Lane D Lane E Lane F Lane G Lane H Lane I Lane J				

DOUBLE ELIMINATION

The Double Elimination Diagram is set up for the Colorado competition with 55 cars racing in 10 lanes. This diagram will illustrate how the competition will progress through the different heats.

RACE 1: Race cars in heats of nine to ten cars at a time. The two fastest cars from each heat move to Race 3. The remaining slower cars move to Race 2.

RACE 2: These cars all have one loss each. Race cars in heats of nine or ten cars at a time. The two fastest cars from each heat moves to Race 4. The slower cars now have two losses and are done competing.

RACE 3: These cars have no losses. Race cars in heats of eight cars at a time. The two fastest cars from each heat moves to Race 5. The slower cars move to Race 4.

RACE 4: These cars have one loss each. Race cars in heats of eight to ten. The two fastest cars from each heat move to participate in Race 5. The slower cars now have two losses each and are done competing.

RACE 5: The remaining 10 cars compete for first, second, third, fourth, and fifth place.

Intramural Race

The purpose of the intramural race is to determine your school's entry to the regional race.

There are several options for determining your school's entry:

1. Teacher decision. It is not mandatory to conduct an intramural race.
2. By the clock. A school can set up one lane per the enclosed instructions and race each car against the clock. The car with best average time becomes the entry to the regional race.
3. Lane races. Construct (at least three) lanes and conduct a modified Double Elimination Race. Instructions for lane construction and race formats are enclosed.
4. Full-scale intramural race. The Junior Solar Sprint is a great opportunity for publicity at many levels (school, local, TV) and a good builder of school spirit. The intramural race can be held at any time prior to the regional race. Use the instructions for lane construction and suggested race format.

Intramural Registration

Complete this registration for each car competing in the Intramural Competition:

NUMBER ASSIGNED TO CAR FOR INTRAMURAL _____

NAME OF CAR _____

STUDENT TEAM

_____ Phone _____

_____ Phone _____

_____ Phone _____

_____ Phone _____

_____ Phone _____

_____ Phone _____

_____ Phone _____

SCHOOL _____

SCHOOL ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE _____

TEACHER _____

TEACHER HOME ADDRESS _____

CITY _____ STATE _____ ZIP _____

HOME PHONE _____

APPENDIX G – Sample Volunteer Training Materials

The 1994 Junior Solar Sprint
by DOE and NREL

Race Rules, Instructions and Schedules for Judges, Monitors and Runners

by Linda Ruff

Track Coordinator: Linda Ruff
(Committee Member)

Judges:	Doug Arent (Lead)	Monitors:	Keith Steel (Lead Monitor)
	Dereck Willis (Assistant Lead)		Alan Ruff (Assistant Lead)
	Rafael Nieves		Sandy Steele
	Mark Maestas		Ed Muljadi
	Shan Ring		Randy Combs
	Greg Baxes		Ernie Oster
	Jamey Evans		Phil Parilla
	Deb Amidandean		Kevin Gill
	Pat Dippo		Phyllis Baines

Practice Track:	Lorie Niles	Youth Volunteer Runners:	Randy Combs
	Brad Thacker		Chris Combs
	Fay Hoover (Lead/Monitor alternate)		Ben Ross
	Amy Ginley		Kwanza Steele
			Morgan Steele

Track-Side Staging Board:
Leslie Hebb
Tiffany Ruff

Rules Committee:
Steve Rummel (Committee Member)
Jamey Evans (Committee Member)

See the attached schedule for your meeting time and work schedule on May 14th.

The heart of the event is the race, and it must run smoothly. It's important that the judges know the information on this page, and the next page thoroughly. The monitors need to understand the steps of the race, and their rolls in enforcing the track monitoring. The four steps of the race are detailed below, followed by more specifics and dispute information.

STAGE:

- The Lead Judge will call for a heat to "STAGE"
- The students will bring their cars to the start
one student at the start
one at the track finish line to catch the car
- The judges will check each car at the start line to
inspection sticker
car number
- The Judge will indicate any "no shows" on the heat card

START

- All spectators will be moved back and the announcement is made that the heat is about to start.
- Each student will set their cars behind the start line, turn on the motor and shield the sun from the car's solar panel by using the "cover", provided by NREL.
- The Lead Judge will signal the start, the students remove the cover over their car, and the race begins. If a car cannot get going on it's own, it will be permissible to let the student **gently** push the car to start the momentum.

RACE

- Students that are racing cars, are not o leave their position at the start, or end, of the track during the race, even if their car has become hung up on the wire or has stopped during the race. Judges and Monitors are to assist moving cars along the track.
- Judges are not to be distracted. They are required to watch every race thoroughly. ANYONE interfering with a judge or the judge's eye contact with the race should be told (by the judge or monitor) to leave or stay stand back during the race.

FINISH

- At the end of each race the judges will agree on first and second place finishers.
- The Judge will acknowledge/announce the first and second winners, so as to avoid disputes later.
- The Lead Judge will indicate **first, second and third** place winners on the head card.

- The Judge will give the heat card to the designated “RUNNER” to take the card to timing.
- Should there be a dispute see below.
- The Judges will begin staging for the next heat.

SPECIFICS

- Approximately 60 schools will each have a car to race.
- The cars have been divided up into “heats” where 10 cars will run one race at a time.
- The track will be ten “side-by-side” lanes, 20 meters long, grouped into pairs, with each pair of lanes 4 feet wide.
- There should be one start judge and three finish line judges during the race.
- **Cars must have passed inspection prior to racing** their first heat.
- Cars may go through design competition after the race, but are encouraged to complete this prior to the race, primarily in case of potential damage to the car.
- The Lead Judge will be provided a heat card with all cars indicated on it for each heat.
- Competition is by process of elimination. The first and second place winners will continue on the winner’s side of the ladder and eight losers continue on the other side.
- A car is eliminated when it has two losses. It’s possible that a few cars won’t have two losses before the final heat, but when the final race is run, the race is formally over.
- A loss can occur by losing a heat –or- by not racing the designated heat.
 Note – If a scheduled car is not on the start line when a Judge signals the heat to start it is a loss. It is the responsibility of the students to be aware of when they are scheduled to run and be on time.

DISPUTES

Should there be a dispute, the Lead Judge should briefly address the dispute with parties making the protest and the other judges at the time of the dispute. If it is not easily resolved it should be referred to Steve or Jamey on the rules committee.

Inspection and Design Judging of the 1993 Sprint

JUDGES

Be as fair as possible. Do not be afraid to call a false start and restage the heat, if needed.

Discourage any interruptions to your duties, because distractions will cause a delay in the event. Don’t become a bottleneck trying to answer questions and help people. Refer people to the committee chairmen, registration or other volunteers.

Any challenge to the results of a race, or to a car’s legitimacy, should be registered as a

protest to the Rules Committee, by the protesting school. Do not try to defend your call or judgment to parents or children, but refer them to the committee.

TRACK MONITORS

You are the track and race event guards.

Keep all people off the track and outside designated area.

- Only students competing in a heat should be at the track's start and end.
- Adults should not be racing cars.
- One student can start the car and one can catch the car at the finish.
- Do not let the students take the cars from the finish line until the Lead Judge indicates he has the winners notated.
- Make sure that the Judges have a clear visual perspective of the entire race to insure fairness.
- No one should be between tracks at any time. The only exception to this, will be the track monitors, or an official event photographer or videographer who does not interfere with the race and the judge's view of all lanes.

PRACTICE TRACK

The practice track is for students, with cars in the event, to practice. Priority should be given to students with serious functional problems, or those needing to test before their race.

RUNNERS

The runner works for the Lead Judge. The main job of the Runner is to carry the heat cards to "timing" with the heat results. They may be asked to go and get something or someone during the race, if the judge needs something. Otherwise **the runner should stay at their post**, close to the lead judge while on duty.

The runner will be given a heat card by the lead judge at the end of a heat. The runner should take the heat card to the timing area immediately. No one else should touch the heat card.

1994 Junior Solar Sprint Volunteer Schedule for Judges and Monitors

Judges, Monitors and Runners on the day of the event:

- Check in at registration by 9:00 a.m., please
 - Pick up your T-shirt and meal ticket for lunch
 - **9:45 a.m. meeting** at the track, in the parking lot of the SERF building (see map)
 - The race is scheduled to start at 11:00 a.m. with trophy ceremony about 2:30 p.m.
- However, to allow for clouds or other delays our schedule extends beyond the posted race times.

INCLUDE A SCHEDULE OF EVENTS AND VOLUNTEERS

1994 Junior Solar Sprint Volunteer Schedule for Judges and Monitors

Judges, Monitors and Runners on the day of the event:

- Check in at registration by 9:00 A.M., please
- Pick up your T-shirt and meal ticket for lunch
- **9:45 A.M. meeting** at the track, in the parking lot of the SERF building (see Map)
- The race is scheduled to start at 11:00 A.M. with trophy ceremony about 2:30 P.M. However, to allow for clouds or other delays our schedules extend beyond the posted race times.

Practice Track Monitor Schedule

	Lead Monitor	Assistant Lead Monitor		
10:30 – 11:00	Fay			Lorie
11:00 – 11:30	Fay			Lorie
11:30 – 12:00	Fay	Amy		
12:00 – 12:30		Amy	Brad	
12:30 – 1:00		Amy	Brad	
1:00 – 1:30		Amy		Lorie
1:30 – 2:00		Amy		Lorie
2:00 – 2:30	Fay		Brad	
2:30 – 3:00		Amy		Lorie
3:00 – 3:30		Amy	Brad	

1994 Junior Solar Sprint Volunteer Schedule for Judges and Monitors

**Lead
Judge**

**Assistant
Lead
Judge**

Race Track Judge Schedule

10:30-11:00	Doug	Dereck	Shan		Mark		Pat		Jamie	10:30-11:00
11:00-11:30	Doug	Dereck	Shan		Mark		Pat		Jamie	11:00-11:30
11:30-12:00	Doug		Shan	Deb		Greg	Pat	Rafeal		11:30-12:00
12:00-12:30	Doug	Dereck	Shan	Deb		Greg		Rafeal		12:00-12:30
12:30-1:00		Dereck		Deb	Mark		Pat	Rafeal	Jamie	12:30-1:00
1:00-1:30		Dereck		Deb	Mark		Pat	Rafeal	Jamie	1:00-1:30
1:30-2:00	Doug	Dereck		Deb	Mark	Greg	Pat			1:30-2:00
2:00-2:30	Doug			Deb	Mark	Greg		Rafeal	Jamie	2:00-2:30
2:30-3:00	Doug	Dereck			Mark	Greg	Pat	Rafeal		2:30-3:00
3:00-3:30	Doug	Dereck		Deb		Greg	Pat		Jamie	3:00-3:30

**Lead
Monitor**

**Assistant
Lead
Monitor**

Race Track Monitor Schedule

10:30-11:00	Doug	Dereck	Shan		Mark		Pat		Jamie	10:30-11:00
11:00-11:30	Doug	Dereck	Shan		Mark		Pat		Jamie	11:00-11:30
11:30-12:00	Doug		Shan	Deb		Greg	Pat	Rafeal		11:30-12:00
12:00-12:30	Doug	Dereck	Shan	Deb		Greg		Rafeal		12:00-12:30
12:30-1:00		Dereck		Deb	Mark		Pat	Rafeal	Jamie	12:30-1:00
1:00-1:30		Dereck		Deb	Mark		Pat	Rafeal	Jamie	1:00-1:30
1:30-2:00	Doug	Dereck		Deb	Mark	Greg	Pat			1:30-2:00
2:00-2:30	Doug			Deb	Mark	Greg		Rafeal	Jamie	2:00-2:30
2:30-3:00	Doug	Dereck			Mark	Greg	Pat	Rafeal		2:30-3:00
3:00-3:30	Doug	Dereck		Deb		Greg	Pat		Jamie	3:00-3:30

Sample Heat Card

NEVIN PLATT MIDDLE SCHOOL A CAR #45			
HEAT	LANE	W	L
6	G	1	
12	F	3 rd	
15	D		✓

THIS IS YOUR HEAT CARD

- When your heat is called, give this card to the starting line judge.
- Shortly after the heat, you may pick up your card at the scorekeeper's table with your next heat and lane assignment recorded on it.

APPENDIX H -

RACE DAY CHECKLIST

Monday: May 10, 1993

Last meeting of the Planning Committee
List of schools that are participating
Provide Master of Ceremonies with information
Dry run of score keeping computer system

Track needs work this week

Build
Eyelets attached

Items to pick up:

- **T-shirts, Duck Company, get invoice, do request for check (pick up Weds/facilities)**
- **Jade Mountain, exhibits/products (delivery Tuesday)**
- **Track/Warren Tech (delivery Friday afternoon)**
- **Scoreboard, Easels, Banner, Signs/Warren Tech (delivery Friday afternoon)**
- **Trophies, Ribbons/Colorado Badge and Trophy (pick up Thursday afternoon)**
- **Western Catering, Inc., (need invoice, do request for check, final count Thursday afternoon)**
- **Solar World cells cut and mounted on the trophies (delivery to Colorado Badge and Trophy no later than Tuesday COB)**
- **Programs duplicated (Wednesday to copy center)**

Wednesday: May 12, 1993

Training for the Volunteers 2:00 – 5:00 17/4B
Show video
Run down of the entire day
Check with volunteer in charge of that area
If not, check with Gloria

Friday: May 14, 1993

Set up track and practice track in courtyard
Rope off area with spectator tape
Set up registration area
3 tables, chairs for school registration
1 table, chairs for volunteers, exhibitors and press

Registration signs

3 signs for parking lots

- 1 sign for student registration
- 1 sign for volunteers, press, and exhibitors
- Name tags for exhibitors and press
- Packets for participants
 - Race program
 - Lunch tickets
 - T-shirts
 - Name tags
- Set up Inspection area
 - 3 tables, chairs
 - signs from courtyard to Bldg.
 - signs for inspection tables
 - Inspection checklist forms
 - walkie talkie
 - pencils for inspection team
 - set up of inspection guidelines
- Set up Design area
 - 3 tables, chairs
 - signs for tables
 - Design score sheets for judges
 - walkie talkie
 - Pencils for judges
- Set up work stations
 - 5 tables and chairs near outlets for students to work on cars
- Race Start area
 - Table, chair
 - List of the schools
 - 2 easel charts to write now and next heats
 - eraser
 - marker pen
- Crowd control devices
 - Cones, roping, signs, PA system
- Check equipment
 - PA system
 - Scoring system
- Gazebo area
 - Trophy table
 - Raffle prizes, giveaways
 - Solar hats from Photocomm
 - NREL backpack
 - NREL travel kit (Prize for sponsor's race)
 - NREL Frisbees
 - Bandimere t-shirts
 - Hang signs for information, lost and found, officials
 - Scoreboard position
 - Hang banner

Parking lot

- Confirm time of delivery for Sanolets
- Sanolets delivered to parking lot (someone there to show where)
- Cones and roping
- Trash cans and recycle bins
- Inform security of activities
- SAC tent set up
- Tables and chairs for lunch

Saturday:

- Bring out t-shirts
- Registration packets
- NREL information both – table and chair
- Car display – rope off
- Lunch truck set up
- Film for kid photographers
- Instructions to Colorado Institute of Art photographers

Sponsors race:

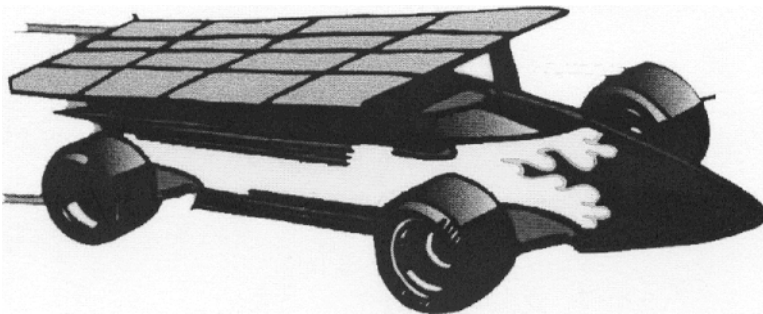
- DOE
- NREL
- Unique Mobility
- Bolle America
- Keystone Science School
- Photocomm, Inc
- Warren Occupation Technical Center

**U.S. Department of Energy's
National Renewable Energy laboratory**

With

**Midwest Research Institute
Battelle
Bechtel
Kaiser – Hill Company
Waterworld
Eldorado Artesian Springs
And Six Flags Elitch Gardens**

**Presents
The Tenth Annual**



**Colorado
Junior Solar
Sprint**

A national solar powered
Model car competition for
Students in grades 6, 7,
and 8

May 13, 2000

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INTRODUCTION

Junior Solar Sprint is an annual competition for sixth, seventh and eighth grade students to design, build and race model solar-powered cars steered by guide wires. The students purchase kits which include a motor and photovoltaic module. The chassis, wheels and transmission are made from any other materials. Students are encouraged to use math and science principles, together with their creativity, in a fun, hands-on educational program that stimulates enthusiasm for science at a crucial stage in their education.

Hands-on design has a different feel from textbook problem solving, or even traditional science labs. There is no single correct answer, any number of solutions developed by students can work. We have found that students are excited about generating ideas in a group and then building and modifying models based on these ideas. Students can see for themselves how changes in design are reflected in car performance. Teachers/coaches will have the opportunity to guide their students through a process similar to those used by professional design engineers.

The goals of the program are as follows:

- Present science concepts in a fun and exciting way.
- Give students a chance to interact with engineers and scientists.
- Stimulate creative thinking through a hands-on design project.
- Help students to experience the satisfaction of creating a working machine and the excitement of entering it in a competition.

<p style="text-align: center;">EVENT DAY AGENDA COLORADO JUNIOR SOLAR SPRINT COMPETITION National Renewable Energy Laboratory</p>
--

<u>Time</u>	<u>Event</u>	<u>Location</u>
9:00 am	Registration	Solar Energy Research Facility- Solarium Area
9:00 am	Inspection	Solarium Area
9:30 am	Design Categories Judging	Solarium Area
10:00 am	Team Photos	Check at Registration for location
10:45 am	Opening Ceremony	Parking Lot – Stage
	Welcome & Announcement <ul style="list-style-type: none"> Linda Lung, Education Programs National Renewable Energy Laboratory 	
	Opening Statement – Race Logistics <ul style="list-style-type: none"> Julie Baxes – Master of Ceremonies 	
	Race Protocol <ul style="list-style-type: none"> Dr. David Ginley, Team Leader, Special Projects National Renewable Energy Laboratory 	
11:00 am	Race Competition	Parking Lot
11:30-12:30 pm	Lunch	Solarium Area
12:30 pm	Race Competition	Parking Lot
To Be Announced	Final Competition	Parking Lot
To Be Announced	Awards Ceremony <ul style="list-style-type: none"> Dr. Larry Kazmerski, Center Director National Center of Photovoltaics National Renewable Energy Laboratory Race & Design Competition 	

PARTICIPATING SCHOOLS

Below are the school names and the team members of the competing schools:

Arvada Middle School – Arvada, CO

Coach: Claudia VanWie

Car # and Name: 37

Team Members:

Joey O'Hayre

Steve Baughman

Jerry Casper

Manual Mossman

Beacon Country Day School – Englewood, CO

Coach: Steve Davenport

Car # and Name: 1 Zoomin

Team Members

Brian Davenport

Kevin Cahn

Shawnette McChesney

Amber Smith Roberts

Coach: W.T. Loner

Car # and Name: 2 Royal Fury

Team Members:

Steven Addison

Adam Loner

Bell Middle School – Golden, CO

Coach: Elaine Connolly

Car # and Name: 40

Team Members:

Car # and Name: 41

Team Members:

Eagle Valley Middle School – Eagle, CO

Coach: Kim Whelan

Car # and Name: 3

Team Members:

Louis Romersheuser

Car # and Name: 4 Stud –Meister

Team Members:

Jacob Rivera

Zach Henry

Fountain Middle School – Fountain, CO

Coach: Jill Brickner

Car # and Name: 5 GAS (Greg And Sean)

Team Members:

Greg Rhinehart

Sean Behan

Car # and Name: 6 Speed Racer

Team Members:

Lee Stover

Dustin Jones

Hayden Middle School – Hayden, CO

Coach: Greg Richards

Car # and Name: 7 Devil's Ride

Team Members:

Jason Rolando

Lucas McElroy

Shai Engle

Car # and Name: 8 CUBYBY

Team Members:

Jordan Rolando

Jeremy May

Joey Vreeman

Highland Middle School – Ault, CO

Coach: Chalee Stofflet

Car # and Name: 9 Husky Roadster II

Team Members

Ray Gonzales

Justin Davis

Tony Martinez

Michael Guerrero

Car # and Name: 10 Husky Roadster I

Team Members:

Holly Shipps

Caylee Rush

Janette DeHoyas

Etc.-----

2000 JUNIOR SOLAR SPRINT RACE RULES AND VEHICLE SPECIFICATIONS

NOTE: Change to rule #10 in section Conduct of the Race

The object of the 2000 Junior Solar Sprint competition is to design and build a vehicle that will complete a race in the shortest possible time using the available power.

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 race course. The winner of the competition will be the team whose vehicle is the top finisher in a series of head-to-head double elimination rounds.

NOTE: All JSS cars must be built by the student with limited assistance from the coach or other adults. **This is a student competition!**

Materials:

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

Vehicle Specifications:

1. The vehicle must be safe to contestants and spectators, e.g., no sharp edges, projectiles, etc.
2. The vehicle must fit the following dimensions: 30 cm. by 60 cm. by 30 cm.
3. Decals of the sponsor organizations (provided by JSS) must be visible from the side on the body of the car. A 3 cm. space must be left for the assigned car number.
4. The sun's light is the only energy source that may be used to power the vehicle. No other batteries or energy storage devices are permitted.
5. Any energy-enhancing devices, like mirrors, must be attached to the vehicle.
6. The vehicle must be steered by the guide wire using one or more eyelets affixed to the vehicle. The vehicle must be easily removable from the guide wire, without disconnecting the guide wire.
7. The body of the **car must be three dimensional**. Teams will **NOT** be allowed to bolt the axles and wheels to the solar cell. The solar cell cannot be used as the body of the car.

Track Specifications:

1. The length of the race course is 20 meters over flat terrain.

2. Race lanes are at least 60 cm. wide.
3. 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.
4. The track is a hard, flat smooth surface such as a tennis court or running track. A large sheet of rolled material, i.e., plastic, heavy paper, or roll roofing (half-lap), or hardwood taped or bolted together may be used to cover an unsuitable surface.

Conduct of the race:

1. 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 (NREL will provide at the regional competition), but not touching the solar panel. The opaque sheet will be removed at the start of the race, allowing the vehicle to collect solar power and start driving.
2. 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.
3. All vehicles will be started when the official signal is given. The winner of the heat will be the first vehicle to cross the finish line or the farthest car down the lane.
4. During the initial heats, the judges may declare multiple wins or losses.
5. One team member must wait at the finish line to catch the vehicle.
6. 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.
7. The vehicle and team member must remain at the finish line until the order of the race has been established.
8. Lane changing or crossing will result in disqualification. (At the discretion of the judges.)
9. Challenges must be made before the race judges begin the next heat. All challenges must come from the team members who are actively competing. The decisions of the race judges are final.
10. Judges **will** inspect cars prior to the final heat or at anytime during/after heats.

Awards:

1. Awards will be given for the five fastest cars and for the five best design vehicles including technical merit, craftsmanship and innovation.

PLANNING COMMITTEE

The Planning Committee would like to especially thank all of the volunteers for encouraging, motivating and challenging Colorado's students to pursue interest in math, science, technology, and engineering.

The Junior Solar Sprint Competition is successful because of the efforts of people like you.

Planning Committee: Jeff Alleman, Dave Ginley, Ray Hansen, Linda Lung, Bill Marion and George Douglas

Volunteers:

Jeff Alleman
Julie Baxes
George Douglas
Anna Duda
Dave Ginley
Don Green
Margaret Jo Gregg
Warren Gretz
Les Hancock
Ray Hansen
Henry Felton
Doug Hooker
Randy Hoover
Keri Kies
Benjamin Kurtz

Calista Bernard
Sarah Kurtz
Paul Lowthian
Linda Lung
Bill Marion
Evelyn Matthews
Jeanne McGraw
Mike Montoya
Sherry Norman
Ralph Overend
Steve Roberts
Matt Rummel
Steve Rummel
Don Selmarten
Karen Stiveson
Anna Talamandez

ACKNOWLEDGEMENTS

SPONSORS

U.S. Department of Energy – Washington DC
William B. Richardson – Secretary of Energy

Office of Energy Efficiency & Renewable Energy
Dan W. Reicher – Assistant Secretary

Office of Budget, Planning & Management
Patricia H. Rose

Office of Power Technologies
Office of Photovoltaics & Wind Technology
Jim Rannels
Richard J. King

Midwest Research Institute – Battelle – Bechtel

National Renewable Energy Laboratory
Golden, CO

Kaiser – Hill Company
Golden, CO

Water World
Denver, CO

Eldorado Artesian Springs
Eldorado Springs, CO

Six Flags Elitch Gardens
Denver, CO

SPECIAL THANKS TO

Dr. Larry Kazmerski
National Renewable Energy Laboratory
Golden, CO

Julie Baxes – Master of Ceremonies

David Parsons – Photography

Duck Company – T-shirts
WheatRidge, CO

Award and Sign Connection, Ltd. – Trophies
Englewood, CO

Quizno's
Lakewood, CO

Dave Parsons – Photographer
Denver, CO

Butler Rents
Denver, CO

Multimedia Audio Visual
Denver, CO

BFI
Denver, CO

APPENDIX J – Sample Inspection Design Form

Junior Solar Sprint

Car Number _____

school _____

Inspection Checklist

____ Car length not greater than 60 cm.
car

____ Sponsor decals mounted on side of

____ Car width not greater than 30 cm.
end

____ Eyelet on bottom of car near front

____ Car height not greater than 30 cm.

____ Original motor (not modified)

____ Original solar panel (not modified)

____ At least one wheel driven by motor

____ Three dimensional body shell

____ No radio control device

____ Number mounted on each side of car

____ No batteries or storage device

Car weight

= _____

☐ Passes Inspection ☐ Fails Inspection

Signature of Inspector

Best Design Scoring

Poor	0-1
Fair	2-3
Good	4-5-6
Impressive	7-8
Awesome!	9-10

Category	Points Earned
Chassis	
Transmission	
Solar Array	
Appearance	
Craftsmanship	
Innovation	

Total Points

Signature(s) of Design Judge(s)

BEST DESIGN CATEGORIES

Awards will be given for the BEST DESIGN. Points are earned in 6 categories. There is a maximum of 10 points per category on the following scale:

0 - 1	2 - 3	4 - 5 - 6	7 - 8	9 - 10
POOR	FAIR	GOOD	IMPRESSIVE	AWESOME!

Please be CONSISTENT in awarding points in the following categories:

CHASSIS: How well constructed are the frame, bearings, tires, etc.

TRANSMISSION: How well mounted is the motor and how efficiently is power transmitted to the wheels?

SOLAR ARRAY: How well oriented is the solar panel for light reception?

APPEARANCE: How well designed and how well finished is the car?

CRAFTSMANSHIP: How well constructed is the car overall?

INNOVATION: How much creativity overall?

APPENDIX K – sample Evaluation Forms

Evaluation Form

June 9, 1994

Dear Junior Solar Sprint participant;

Thank you for participating in the Colorado Junior Solar Sprint competition. We could tell by the amount of time and effort you put into your cars. We appreciate you being at this event!

NREL is planning a Junior Solar Sprint evaluation meeting on June 20 and 21, 1994. The meeting will take place from 1 p.m. to 5 p.m. on Monday, June 20 and from 8 a.m. to noon on Tuesday, June 21. We will meet in conference room 16/3A in Building 16 at 1617 Cole Boulevard, Golden, Colorado. This meeting will cover the national Sprint competitions, as well as feedback from the Colorado Sprint. Please RSVP to me by June 17 if you can attend all or part of this meeting.

Your feedback of the Sprint is important to us. If there is any way to improve the competition we want to know about it. If you cannot attend the evaluation meeting please take the time to complete the enclosed evaluation forms and return them to me by June 17, 1994. The results of the evaluation will be compiled for a report to be presented at the evaluation meeting.

Thank you in advance for helping us improve the Sprint competition. We look forward to seeing a team from your school next year!

Sincerely;

Gloria Kratz
The Center for Science Education
(303) 275-3069
1-800-NEW-ENGY
FAX: (303) 275-3076

Colorado Junior Solar Sprint Competition

May 14, 1994

Please take a few minutes to complete this evaluation form about the Colorado Junior Solar Sprint competition. We are always trying to improve this event so your feedback is very important.

Please rate the following components of the competition. Use the scale of 5 being the highest and 1 the lowest. If you did not use the material, please indicate why.

Are you a coach _____ or a student _____?

Materials

Getting Started Packet	5	4	3	2	1
Comments: _____					

Teacher Guide	5	4	3	2	1
Comments: _____					

Student Guide	5	4	3	2	1
Comments: _____					

Computer Software/instructions	5	4	3	2	1
Comments: _____					

Video	5	4	3	2	1
Comments: _____					

Color Flyer	5	4	3	2	1
Comments: _____					

Would a teacher in service have assisted you in assisting the students build their cars?

Newsletter #1	5	4	3	2	1
Comments: _____					

Newsletter #2	5	4	3	2	1
Comments: _____					

What other information would have been beneficial in the newsletters?

Administration

Timeliness of materials	5	4	3	2	1
-------------------------	---	---	---	---	---

Comments: _____

Did you use the 1-800 telephone number? _____ Yes _____ No

Did you receive prompt answers to your questions? _____ Yes _____ No

What could NREL have done to better assist you?

Race Day

Registration	5	4	3	2	1
--------------	---	---	---	---	---

Comments: _____

Practice Track	5	4	3	2	1
----------------	---	---	---	---	---

Comments: _____

Track	5	4	3	2	1
-------	---	---	---	---	---

Comments: _____

Lunch	5	4	3	2	1
-------	---	---	---	---	---

Comments: _____

Awards	5	4	3	2	1
--------	---	---	---	---	---

Comments: _____

What did you like most about the Junior Solar Sprint?

What did you like least about the Junior Solar Sprint?

Suggestions, comments, ideas, complaints

Please return this evaluation form to: Gloria Kratz, Special Events Administrator, NREL,
1617 Cole Blvd., Golden, CO 80401. FAX # (303) 275-3067. 1-800-NEW-ENG

June 10, 1994

Dear Junior Solar Sprint Coach:

On May 14, 1994, NREL sponsored the Junior Solar Sprint competition. You had signed up to participate, and ordered kits, but a team from your school did not compete. We would like to find out why. Was there a conflict with the date? Was traveling to Golden, Colorado on a Saturday a consideration for not coming? Were the materials useful?

As we begin preparation for next year's competition, we would like your feedback. Please take a few moments to complete the enclosed evaluation form and return it to me. We would like to see as many teams as possible compete in this event.

Thank you for your comments, suggestions and ideas.

Sincerely,

Gloria Kratz
Center for Science Education
(303) 275-3069
1-800-NEW-ENGY
FAX: (303) 275-3076

Colorado Junior Solar Sprint Competition

Please take a few minutes to complete this evaluation form about the Colorado Junior Solar Sprint competition. We are always trying to improve this event so your feedback is very important.

Please rate the following components of the Junior Solar Sprint. Use the scale of 5 being the highest and 1 the lowest. If you did not use the material, please indicate why.

Materials

Getting Started Packet	5	4	3	2	1
------------------------	---	---	---	---	---

Comments: _____

Teacher Guide	5	4	3	2	1
---------------	---	---	---	---	---

Comments: _____

Student Guide	5	4	3	2	1
---------------	---	---	---	---	---

Comments: _____

Computer Software/instructions	5	4	3	2	1
--------------------------------	---	---	---	---	---

Comments: _____

Video	5	4	3	2	1
-------	---	---	---	---	---

Comments: _____

Color Flyer	5	4	3	2	1
-------------	---	---	---	---	---

Comments: _____

Newsletter #1	5	4	3	2	1
---------------	---	---	---	---	---

Comments: _____

Newsletter #2	5	4	3	2	1
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Comments: _____

What other information would have been beneficial in the newsletters?

Administration

Timeliness of Materials	5	4	3	2	1
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Comments: _____

Did you use the 1-800 telephone number? ____ Yes ____ No

Did you receive prompt answers to your questions? ____ Yes ____ No

Reason for not participating in the Junior Solar Sprint competition:

Would a teacher in service have assisted you in assisting the students build their cars?

What could NREL have done to better assist you?

Suggestions, comments, ideas, complaints

Please return this evaluation form to: Gloria Kratz, Special Events Administrator, NREL,
1617 Cole Blvd., Golden, CO 80401. FAX # (303) 275-3076. 1-800-NEW-ENG