

Guidelines for the Solar Schoolhouse Olympics Lodi - 2005



The Rahus Institute – Solar Schoolhouse Program
www.solarschoolhouse.org

Introduction: The Second Annual *Solar Schoolhouse Olympics* in Lodi is scheduled for May 7, 2005. Students prepare solar projects in categories that draw on various disciplines, including science, mathematics, English, communications, art and business. Students are challenged to use their capabilities in design, construction, oral presentation, written communication, and artistic expression. Students will also develop project management skills and team work. *Solar Schoolhouse Olympics—Lodi* is **sponsored by the City of Lodi Electric Utility Department**.

Solar Schoolhouse is a program of **The Rahus Institute**, a 501c3 non-profit organization.

Who is eligible: Schools in Lodi Unified School District, grades 4-12. All other schools within the City of Lodi, grades 4-12. Each event category will be divided into Elementary (E), Middle School (M) and High School (H) age groups

Prizes:

Overall School Team: Winning School Team will earn a framed certificate for their school recognizing their collective achievement. They will also earn \$500 worth of solar electric equipment that can be used for projects at their school. One for each grade level (E,M,H)

Individual Event Winners: 1st, 2nd and 3rd place finishers will receive certificates and solar powered prizes.

T-shirts with the winning Art design and certificates will be given to all participants.

Participation Limits: Students may participate in a maximum of two events; each student entry must have a school teacher representative.

Schedule:

- * Workshops for Educators – Check website
- * Workshop for Students – Consultation with Hal or Tor about project specific questions. Check website for date & location.
- * March 18, 2005 – Deadline for teachers to register intent to enter Solar Schoolhouse Olympics and which events online at www.solarschoolhouse.org
- * March 18, 2005 – Deadline to register online to receive **FREE** Event kits for your team. Limited quantities available. www.solarschoolhouse.org Kits will be distributed as requests are received.
- * April 5, 2005 Deadline for entry of Art/T-shirt design, PSA, and Comic Strip events.
- * **May 7, 2005** – Solar Schoolhouse Olympics at Lodi High School in Lodi, California

Events

- | | |
|----------------------------|----------------------------|
| * Solar Cooker | * Open Design |
| * Model Solar Home | * Energy Expert Game |
| * Solar Art/T-shirt design | * Solar Comic Strip Design |
| * Solar Car Race | |
| * Solar Fountain/Sculpture | |

Resources Available: For some of the events, starter kits have been assembled to provide a common basis for project design. For example, solar car kits include a solar electric panel, gears, wheels, axles, and motors. The Solar Fountain kit includes a solar electric panel and pump. These items will stay with the school after the Olympics. Additional tips for wiring solar cells, basics of solar electricity, solar history, and other links are available online at www.solarschoolhouse.org

Location: The Solar Schoolhouse Olympics will be held at Lodi High School

Schedule: 10:00am to 1:30pm.

Solar Schoolhouse Olympic Contact: Do you have a question about the Olympics? Need some supporting documents? Visit the website at www.solarschoolhouse.org and look for the Lodi Solar Schoolhouse Olympics link from the homepage.
Or call ...

Lodi Solar Schoolhouse Olympic Contacts:

Tor Allen

Solar Schoolhouse Program Manager
The Rahus Institute, 1535 Center Ave., Martinez, CA 94553
Ph: 925-370-7262 FAX: 925-889-2322
e-mail: lodisolarschoolhouse@rahus.org

Hal Aronson

Solar Schoolhouse Project Support – technical questions about projects
Ph: 510-665-7747
Email: hal@rahus.org

Lynne Greulich

Local Event Coordinator – volunteer judge coordinator, site coordination, sponsors, advertising.
Email: lynne@rahus.org

Rob Lechner

Program Manager
City of Lodi Electric Utilities Department
Ph: (209) 333-6800 ext. 2583
Email: rlechner@lodielectric.com

Solar Cooker Event

The Challenge

Design and construct a solar cooker that is capable of **cooking** a food item that you will prepare and share with the group at Solar Schoolhouse Olympics. The solar cooker should also be able to boil water. Be prepared to explain your design.

Guidelines and Requirements

1. “Solar” recipes are available in the books *Cooking with the Sun, Heaven’s Flame* or online at www.solarschoolhouse.org, or you can make up your own. There are no requirements about which food item you select or the quantity that you prepare. Try to have enough for at least 10 people to taste.
2. The solar cooker can’t be connected to any outside power source or use any other heat source except sunshine on the day of Solar Schoolhouse Olympics.
3. No commercially bought ovens are allowed
4. There are two performance tests: a. time to boil a ½ pint of water or max temperature achieved in one hour (if water does not boil) b. cook food of choice.

Judging Criteria

Criteria	Points
Innovation in design or materials - New concepts, ideas, approaches vs. a standard plan from published source	20
Quality / durability of construction - Well-built design using stable materials; seals fit; cooker can be re-used	20
Performance 1- Taste: Cooker cooks food of choice successfully at SSO.	20
Performance 2: Time to boil a ½ pint of water in black painted jar with clear window for viewing inside of jar. Jar and thermometer to be provided by Solar Schoolhouse. If water does not boil within an hour, then the maximum temperature will be recorded.	1st earns 20 points, other finishers scored proportionally
Explanation of design - Prepare a 2 page User Guide, describing how your solar cooker works. 3 minute explanation of your cooker design in theory and practice. Be prepared to answer judges’ questions.	20
MAXIMUM POINT TOTAL	100

Solar Cooker Recipes and Resources Available

Websites

www.solarschoolhouse.org

www.solarcooking.org

Starter Kits for Solar Schoolhouse Olympics Participants

Solar Oven

1 – oven thermometer

1- book – “Heaven’s Flame” (1 per school instructor)

Sign up to receive these kits when registering for the Solar Schoolhouse Olympics at www.solarschoolhouse.org

Model Solar Home Event

The Challenge

Design and construct a model solar home for your regional climate. The model home may integrate a small solar electric panel to produce electricity, solar hot water panels to heat water, passive solar design for heating and cooling of your home, windows/skylights to bring light into the home, and any other feature that uses the free fuel of the sun to heat, cool, and power your home.

Guidelines and Requirements

1. Model solar home should fit on a base no larger than 30" x 30" and be portable.
2. Model Home can be a remodel of your existing home, or a completely new design.
3. Research typical climate and seasonal conditions for the geographical region in which your home is designed to function in. View video "Your Solar Home" for ideas.
4. Describe on 8 1/2 by 11 inch sheet of paper your home's design features and how they relate to local climate and seasonal conditions. Be prepared to answer judge's questions.
5. (Optional) Use the Event kit materials (Reserve kit online at www.solarschoolhouse.org - solar panel, motor, fan) to add 'solar electricity' to your model.
6. (Optional) Add a functional or symbolic model solar thermal collector to your home (eg. Solar hot water panel or batch collector, or small greenhouse), if possible. "Functional" means that the water or air will warm up when placed in the sunlight.
7. (Recommended). Use recycled materials (cardboard, tiles, etc.) wherever possible.
8. Ok to integrate landscaping materials if landscaping is designed to enhance performance of home; eg. Trees for shading, earth berming for thermal mass.

Judging Criteria

Criteria	Points
Innovation in design or materials - Innovative use of concepts or material in creating a solar home.	20
Quality / durability of construction - Well-built design using stable materials, innovative use of recycled materials for model construction. Ease of access to interior of home (eg. Removable roof, or access through side window or wall)	20
Aesthetics – Home design is attractive. Rooms are thoughtfully located.	20
Performance – Proportion of window area, thermal mass, eaves, "insulation," and living space will provide for the heating/cooling needs of the home. Solar electric and solar hot water model elements function when exposed to direct sunlight	20
Explanation of design – Prepare a written explanation describing the key features of your model solar home. Prepare a 3-5 minute explanation of your model solar home design in theory and practice. Be prepared to answer judges' questions.	20
MAXIMUM POINT TOTAL	100

Model Solar Home Resources Available

Websites

www.solarschoolhouse.org - model home building design tips

Starter Kits for Solar Schoolhouse Olympics Participants

Model Solar Home

1 - 1V solar panel, motor, assorted fans/wheels, wire

Sign up to receive this kit when registering for the Solar Schoolhouse Olympics at www.solarschoolhouse.org

Solar Fountain Event

The Challenge

Design and construct a **portable** solar fountain for your school using a photovoltaic (solar electric) panel. Maximize the educational value of the fountain as a teaching tool for future classes.

Guidelines and Requirements

1. Register to receive a solar electric module, pump, and meters for your fountain through www.solarschoolhouse.org
2. Fountains for the Solar Schoolhouse Olympics must be **portable** and able to be brought to the event. (*Permanent fountains for your school are also a great project, and encouraged as a class/school project, though not part of the Olympics. Contact Rahus-Solar Schoolhouse for assistance with permanent fountains.*)
3. Design fountain to maximize the education value. Allow for interaction with the solar panel so as to experience the effects of shading, orientation, and tilt angle
4. No batteries are allowed or any power source other than sunlight.
5. Develop and incorporate an educational interpretive sign as part of your fountain. Develop a user guide for how to use your solar fountain as a solar energy teaching tool.

Judging Criteria

Criteria	Points
Innovation in design or materials - Original aesthetic or functionality of the solar fountain rather than imitation of existing plan or fountain.	20
Quality / durability of construction - Well-built design using stable materials, and rated for outdoor exposure. Placement of solar module in shade-free zone. Re-used or recycled materials will improve score.	20
Artistic expression – A beautiful, elegant, and/or artistic design. Fountain may be sculptural, meditative, or expressive in some other way.	20
Performance – Through proper positioning of solar panel, Solar Fountain successfully circulates water most of the day, ie. Between 10am and 3pm. Demonstrate the interactive features.	20
Explanation of design – Prepare an educational interpretive sign for passerbys that is part of the fountain structure. Remember: sometimes simple is better. Prepare a 5 - 7 minute explanation of your Solar Fountain design in theory and practice. User Guide will describe how your fountain can be used as a classroom solar energy teaching tool. Be prepared to answer judges' questions.	20
MAXIMUM POINT TOTAL	100

Solar Fountain Resources Available

Websites

www.solarschoolhouse.org

Starter Kits for Solar Schoolhouse Olympics Participants

Solar Fountain

- 1 – 35 watt Solar Module
- 1 – pump
- 1 – set of volt/amp analog meters

Sign up to receive this kit when registering for the Solar Schoolhouse Olympics at www.solarschoolhouse.org

Solar Car Event

The Challenge

Design and construct a model solar car using **one standard 10.5" x 5" 3 watt solar module** and **one standard motor** provided by Solar Schoolhouse. The car must be capable of traveling a 20 meter long race course.

Guidelines and Requirements

1. One standard solar panel and one standard motor, both from the Solar Sprint car kit supplied via the Solar Schoolhouse program, must be the only sources of propulsion for the car.
2. Choice of gears up to entrant; gears are available through Solar Schoolhouse.
3. Tires can be any size and material you choose.
4. The car cannot include batteries.
5. A minimum of two team members per car are required at day of race.
6. To keep the car moving in a straight line along the race course, a guide wire will be included on the course. The guide wire can be attached above or below the chassis of the car. Your car must include the means of attaching the car to the wire (screw eye or paper clip are common).

Judging Criteria

Criteria	Points
Innovation in design or materials – New look, mechanical designs, approaches vs. a standard plan from published source	20
Explanation of design - Prepare a succinct 2 minute explanation of your car design demonstrating understanding of solar electricity and how your design is meant to make your car fast.. Be prepared to answer judges' questions.	20
Artistic expression - Incorporation of decorations, school colors and logos, other artistic elements. Quality of construction.	20
Speed - Points will be awarded for the top 7 finishers in the car derby race.	40/30/25/20/15/10/5
MAXIMUM POINT TOTAL	100

Solar Car Resources Available

Websites

www.solarschoolhouse.org

www.nrel.gov/education/student/natjss.html

Starter Kits for Solar Schoolhouse Olympics Participants

Solar Car

- 1 – Solar Panel – 10.5"x 5", 3 watt Solar Module
- 1 – motor
- 1 – set of wheels, gears, axle.

A limit of 5 kits per classroom (15 total per school), are available for Free. Information on where to get additional parts is provided online at www.solarschoolhouse.org

Sign up to receive this kit when registering for the Solar Schoolhouse Olympics at www.solarschoolhouse.org

Solar Art/T-Shirt Event

The Challenge

Create a design to be used for the Solar Schoolhouse Olympics T-Shirt that presents one or more of the concepts of using solar energy to heat, cool or power our world OR environmental benefits of solar energy.

Guidelines and Requirements

1. The design should include a text message.
2. The design can be in color or black/white.
3. The complete design must be contained within an 8" x 10.5" piece of paper.
4. Include a one page explanation of the design and concepts presented.
5. Provide permission to use in promoting the Solar Schoolhouse program. Submit artwork with entry form.

Final designs must be **received** by **April 5, 2005**. Overall Winning design will be used on T-shirts given out to participants at the Solar Schoolhouse Olympics event in May.

Entry/permission form available on www.solarschoolhouse.org

Mail to:

Solar Schoolhouse Olympics- Lodi
 c/o Rahus Institute
 1535 Center Ave.
 Martinez, CA 94553
 Email: schoolinfo@solarschoolhouse.org

Judging Criteria

Criteria	Points
Communication of message: Does your graphics and text promote solar energy?	20
Target Audience: Do your peers understand the message on the shirt?	20
Innovation: Creativity in design & presentation	20
Artistic expression: Balance; appropriate use of color, media. Appropriate for t-shirt	20
Explanation: Explanation of design message. What message are you trying to get across? (solar heat, solar cooling, solar electricity, environmental benefits of solar...)	20
MAXIMUM POINT TOTAL	100

Solar Art/T-shirt Design Resources Available

Websites

- www.solarschoolhouse.org [links to photo libraries]
- www.californiasolarcenter.org (history section)
- www.nrel.gov/data/pix

Solar Comic Strip Event

The Challenge

Create a comic strip or editorial cartoon that integrates humor and a positive solar energy theme.

Guidelines and Requirements

1. The comic strip/editorial cartoon should have a minimum 1 picture and maximum 10 pictures (frames)
2. The 'story' can be inspired by current events.
3. Black and white only.
4. Original artwork only. Can not use existing comic strip characters
5. Include a title.
6. The complete comic strip must be contained within an 8" x 10.5" piece of paper.
7. Include a description of the solar energy theme you are promoting.
8. Permission to use the comic strip to promote the Solar Schoolhouse program. Fill out entry form.

Final designs must be **received** by **April 5, 2005**.

Entry/permission Form available online at www.solarschoolhouse.org

Mail to:

Solar Schoolhouse Olympics- Lodi
 c/o Rahus Institute
 1535 Center Ave.
 Martinez, CA 94553
 Email: schoolinfo@solarschoolhouse.org

Judging Criteria

Criteria	Points
Communication of message: Can we understand your spelling, writing, and is the point you are making clear.	20
Target Audience: Can your peers understand your message?	20
Innovation: Humor	20
Craft: Consistent style, well-drawn, interesting to look at,...	20
Explanation: What solar energy theme are you explaining or promoting?	20
MAXIMUM POINT TOTAL	100

Solar Comic Strip Resources Available

Websites

www.solarschoolhouse.org
www.californiasolarcenter.org
www.gristmagazine.com

Open Design Event

The Challenge

Design and construct a working solar powered appliance. For example: a solar hot water heater with flat plate collector and storage tank, or a solar electric battery charger.

Guidelines and Requirements

1. Your Solar Design must be able to be brought to the event. Plan on setting up your design and demonstrating it's function.
2. Prepare a 'User Guide' describing the principles of your design and how it works. Use images, diagrams, and text to convey your message.
3. Make sure you test out your design before the Olympics event.

Judging Criteria

Criteria	Points
Innovation in design or materials - Original aesthetic or functionality of the solar design rather than imitation of existing plan.	20
Quality / durability of construction - Well-built design using stable materials, and rated for outdoor exposure. Must be safe.	20
Aesthetic – Is it attractive?	20
Performance – How well does it work? Does it effectively heat the water, or charge batteries or make music...? Demonstrate the interactive features.	20
Explanation of design – Prepare a User Guide describing how your design works. Be prepared to answer judges' questions.	20
MAXIMUM POINT TOTAL	100

Solar Fountain Resources Available

Websites

www.solarschoolhouse.org

Materials & consultation for Solar Schoolhouse Olympics Participants

Contact Hal or Tor with any questions regarding materials and design strategies.

Sign up to receive this kit when registering for the Solar Schoolhouse Olympics at www.solarschoolhouse.org