## 1999 ASEE-TWO YEAR COLLEGE DIVISION MODEL DESIGN COMPETITION

Date: August 29, 1999
Dear Colleague,

On behalf of the of the American Society for Engineering Education (ASEE) - Two Year College Division (TYCD) , I invite you to encourage the submission of student design projects for the 1999 Annual Two Year College Division MODEL DESIGN COMPETITION . This event will be held in conjunction with the ASEE Annual Convention , June 20 - 23, 1999 in Charlotte, NC .

This year a competition of battery - powered model vehicles will take place. The models must adhere to the guidelines of the model design competition and an oral presentation is included as part of the competition.

The main reason for this competition is for students to gain a good understanding of the design process from start to finish. For those schools that have the opportunity to enter both the model competition, your students are in for an extremely valuable experience. Designing and building something from an idea is probably why they chose engineering in the first place. Use this Design Competition as a platform to reinforce their ideas and have some *engineering fun!* I hope to see you and your students' entries in Charlotte .
Please find enclosed the guidelines and registration forms for this event. The interest and registration forms are on the back of this letter.

If you would like to help judge the competition in Charlotte, please contact me at:
Phone : 607-778-5344 FAX : 607-778-5334 e-mail : beston_w@sunybroome.edu

Sincerely,

William C. Beston

PS: At the 1998 ASEE National Freshman Design Solar Oven Graphics Model Competition:

1st Colorado School of Mines
2nd Broome Community College
3rd Washtenaw Community College

# 1999 ASEE-TWO YEAR COLLEGE DIVISION MODEL DESIGN COMPETITION

Charlotte, NC

## MODEL COMPETITION GUIDELINES

The American Society for Engineering Education (ASEE) - Two Year College Division Design competition will be held June 21, 1999, in conjunction with the ASEE Annual Convention in Charlotte, NC .

**MODEL PROJECT:**

**Objective:**

To design and build a battery-powered vehicle that can transverse an oval track with inclined surfaces three times.

**Vehicle Specifications:**

**Allowable battery types:**

| | |
|---|---|
| 9 volt alkaline | (Duracell MN1604 or equivalent) |
| 1.5 volt D alkaline | (Duracell MN1300 or equivalent) |
| AA). | |
| 1.5 volt C alkaline | (Duracell MN1400 or equivalent) |
| 1. 5 volt AA alkaline | (Duracell MN 1 500 or equivalent) |

**Maximum number of batteries:**

9 volt : One

1.5 volt : Eight (any combination of D, C, and

**Maximum vehicle size:**

Height: 5 inches
Width: 7 inches
Length: 15 inches

**Components, Fabrication and Cost:**

Team members using tools and component parts, which are commonly available to the general public must perform all fabrication. Use of a commercially available battery-powered vehicle or its components will not be allowed. The total cost of all components must not exceed $300.

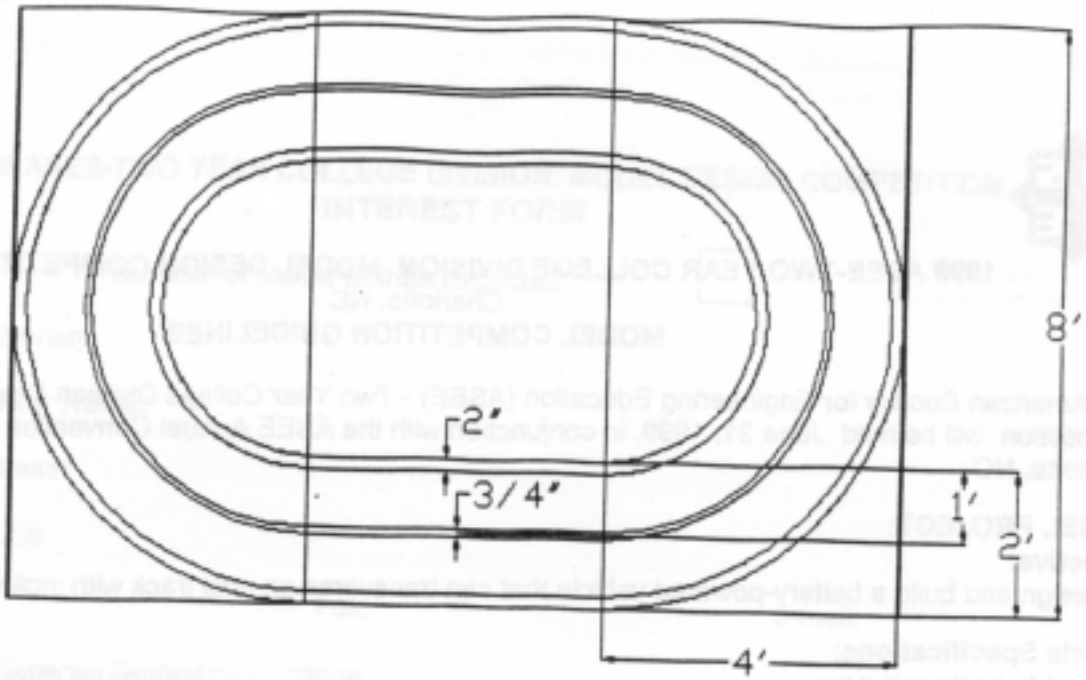
**Vehicle Navigation:**

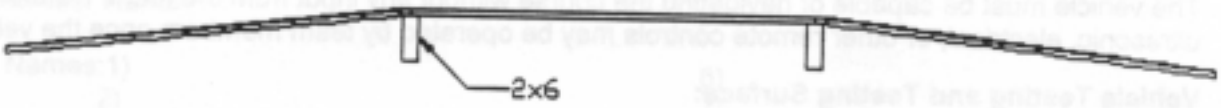
The vehicle must be capable of navigating the course without any input from the team. No radio, infrared, ultrasonic, electrical, or other remote controls may be operated by team members once the vehicle begins moving.

**Vehicle Testing and Testing Surface:**

Before a vehicle will be allowed to be tested it must pass a safety inspection performed by the judges. Any vehicle that presents a safety hazard or has the potential to damage property will not be allowed to be tested.

Vehicles will be tested on a light colored non-carpeted plywood surface. The track shall be formed by placing 3-4x8 $ft^2$ pieces of plywood side by side to form a surface that is 8x12 $ft^2$. The center piece of plywood shall be raised above the floor approximately 5 1/2 inches. (The height of a 2x6 on edge) An oval track shall be formed on the surface such that it is circular on the two outermost pieces and straight on the raised piece. The oval shall be formed using 2" silver duct tape with its outside edge on the outside piece of plywood that is straight and a circular arc that just touches the outside center of the two outside pieces of plywood. The inside edge of the track shall be formed such that the useable track area formed is 2' across. A 3/4 inch wide piece of black electrical tape will be applied around the track on a centerline that is 1 ft in from the outside useable edge of the track. On the raised section of plywood, a start-finish line will be placed with each vehicle required to start within 6 inches of that line without crossing or touching it. A vehicle's time is measured from the start signal given by the judges until the front of the vehicle crosses the start-finish line after having traversed the track three times.




**Scoring and Test Procedures:**

During the test, each team may perform a maximum of three trials. Teams may make repairs or adjustments to their vehicles between trials. No components may be added, replaced or permanently removed. Batteries may be charged or replaced between trials. The batteries onboard the vehicle are the only allowable source of energy. The team may not touch or communicate with their vehicle while it is performing a test. The object of this event is to perform the required task in the least amount of time. A team's lowest time of the trials performed will be used in the judging. If a team fails to complete the test in three trials then the team will receive zero points for the event. For the cars that complete the test satisfactorily, the following points will be awarded:

1st place : 65 points for the fastest car's time in seconds

All other teams receive a score less than 65. The number of points will be determined by taking the fraction formed by taking the fastest car's time in seconds and dividing it by their time in seconds. This fraction will then be multiplied by 65 and rounded off to the nearest whole number. This is the score for that team.

**Speed Test:**
The vehicle will start from rest and travel around the track three times. The vehicle must stay on the official track surfac the
entire time. If any wheel touches the gray duct tape at any time, the vehicle will be disqualified for that trial. Decisions ot the
judges on this matter are final. A vehicle failing to transverse the track three times is disqualified for that attempt.

**Oral Presentation:**
Prior to the testing of the vehicles, each team shall make a maximum 10 minute oral presentation. The oral presentatic will be followed by up to 5 minutes of questions by the judges. If time allows the judges may allow additional questions. Only one spokesperson for each team will be allowed to ask questions if recognized by the judges. Other competing te: members or spectators may not ask questions or make comments during the oral presentation or questioning period. Each team will have a maximum of 5 minutes to begin their presentation once it is their turn.
The oral presentations should include the following components ( each component is worth 5 points):

1. Problem Identification: A description and history of why the vehicle was designed and built.
2. Preliminary Ideas: Problem Formulation
3. Abstraction and Synthesis: Refinement of goals and ideas
4. Analysis: Comparison and evaluation of alternate designs (Scaled drawings of the vehicle need to be included)
5. Final Solution: A discussion of what improvements could be made on future designs is required

In addition, the assessment of the presentation will include two components worth 5 points each.
6. Presentation Quality and Adherence to the Guidelines of the Project
7. A written summary (max of 3 pages) of the presentation shall be given to each judge (5 copies). A parts list, CAD drawings,
and appendix containing copies of the receipts or vendor price list for all parts having a retail of more than $10 is requi

**Scoring:**
The judges will evaluate the content and form of the oral presentation. A copy of the evaluation tool will be available in May, 1999. Teams may receive any integer number of points between 0 and 35. The judges may give an equal score t two or more teams.

**Post Competition Evaluations:**
Prior to awarding the prizes, the judges will provide each team with a brief evaluation of the strengths and weaknesses their design and presentation.

**PROJECT TEAM / ENTRY LIMITATIONS:**

A. Each construction team must have a faculty advisor and at least 2 student members but no more than 10 student members. Each team member must primarily be enrolled in freshmen or sophomore level classes where this design project is introduced. **An identification sheet including the school name, advisor name, and team member names must accompany the car.**

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PROJECT INTEREST AND REGISTRATION FORMS:

Please find the entry forms on a separate page. The Interest Form must be received no later than January 1, 1999. A Registration Form for each model design team must be received no later than June15, 1999 .

ENTRY SUBMISSION DATE AND-TIME:

All model entries must be submitted at the judging display in the Exhibitor's area before 11:30 AM June 21, 1999. (Eastern Time Zone) Do not leave models at the conference registration desk. Transporting the model(s) to the conference is the sole responsibility of the entering school.

JUDGING

Oral Presentations will take place Monday prior to the Vehicle competition at a time and place TBA. Vehicle judging will take place Monday afternoon, June 21, 1999 in the Exhibitor's Hall Area at about 2:00 PM. All decisions made by the judges are final.

AWARDS:

First, second, and third-place team member winners will receive appropriate certificates. The award winning schools will receive plaques.

Please direct questions to:
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Phone : 607-778-5344 FAX : 607-778-5334 e-mail : beston_w@sunybroome.edu
http://www.sunybroome.edu/~beston_w/ASEE_TYCDdesign99