



## ASEE-TWO YEAR COLLEGE DIVISION 2000 MODEL DESIGN COMPETITION

Date: August 31, 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 Annual Two Year College Division 2000 MODEL DESIGN COMPETITION. This event will be held in conjunction with the ASEE Annual Convention, June 18 - 21, 2000 in St. Louis, MO. This competition is open to 2<sup>nd</sup> and 1<sup>st</sup> year students at four and two year colleges.

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 better understanding of the design process from start to finish. 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 St. Louis.

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 St. Louis, 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 1999 ASEE National Two Year College Model Competition in Charlotte, NC:**

**1<sup>st</sup> Tidewater Community College**

2<sup>nd</sup> Broome Community College

3<sup>rd</sup> ITT Tech

**The 1999 ASEE St. Lawrence Section and TYESA Design Competition Team Results in Montreal:**

**Paper Competition:      1<sup>st</sup> Place: Binghamton University**

2<sup>nd</sup> Place: Broome Community College

**Model Competition:      1<sup>st</sup> Place: Jefferson Community College-Mechanical**

2<sup>nd</sup> Place: Binghamton University

3<sup>rd</sup> Place Tie: Broome Community College and Jefferson Community College-Electrical

Other Entries: Binghamton University (3 teams), Broome CC, Clarkson University, Monroe CC



**2000 ASEE-TWO YEAR COLLEGE DIVISION 2000 MODEL DESIGN COMPETITION  
INTEREST FORM**

Number of Model Entries Expected

College/University:

Faculty Advisor Name:

Mailing Address:

City, State, Zip

Phone:

Fax:

e-mail:

Please mail to: Broome Community College

William C. Beston, ASEE National Two Year College Division 2000 Design Competition

901 Front St.

Binghamton NY 13905

This form is due by January 6, 2000

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**2000 ASEE-TWO YEAR COLLEGE DIVISION 2000 MODEL DESIGN COMPETITION**

**REGISTRATION FORM**

College/University:

Faculty Advisor Name:

Student Names: 1)

2)

3)

4)

5)

6)

7)

8)

9)

10)

Please mail to: Broome Community College

William C. Beston, ASEE National Two Year College Division Design Competition

901 Front St.

Binghamton NY 13905

This form is due by June 12, 2000



**ASEE-TWO YEAR COLLEGE DIVISION 2000 MODEL DESIGN COMPETITION**  
St. Louis, MO  
**MODEL COMPETITION GUIDELINES**

The American Society for Engineering Education (ASEE) - Two Year College Division Design competition will be held June 19, 2000 in conjunction with the ASEE Annual Convention in St. Louis, MO.

**MODEL PROJECT:**

**Objective:**

To design and build a battery-powered vehicle that transverses an inclined track in two directions.

**Vehicle Specifications:**

**Allowable battery types:**

9 volt alkaline	(Duracell™ MN1604 or equivalent)
1.5 volt D alkaline	(Duracell™ MN1300 or equivalent)
1.5 volt C alkaline	(Duracell™ MN1400 or equivalent)
1.5 volt AA alkaline	(Duracell™ MN1500 or equivalent)

**Maximum number of batteries:**

9 volt	: One
1.5 volt	: Eight (any combination of D, C, and AA).

**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.

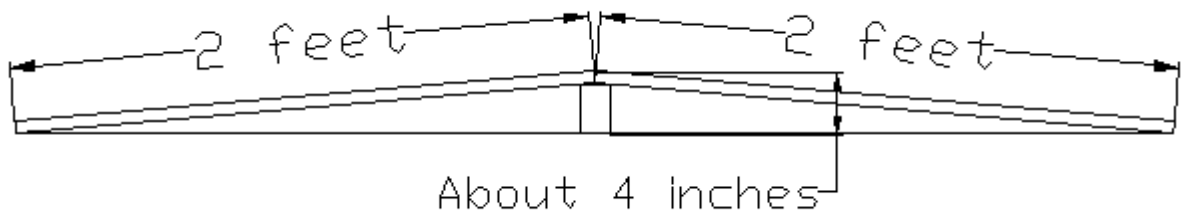
**Vehicle Navigation:**

The vehicle must be capable of navigating the course without any input from the team. Radio, infrared, ultrasonic, electrical, or other remote controls may not be operated by team members once the vehicle begins moving.

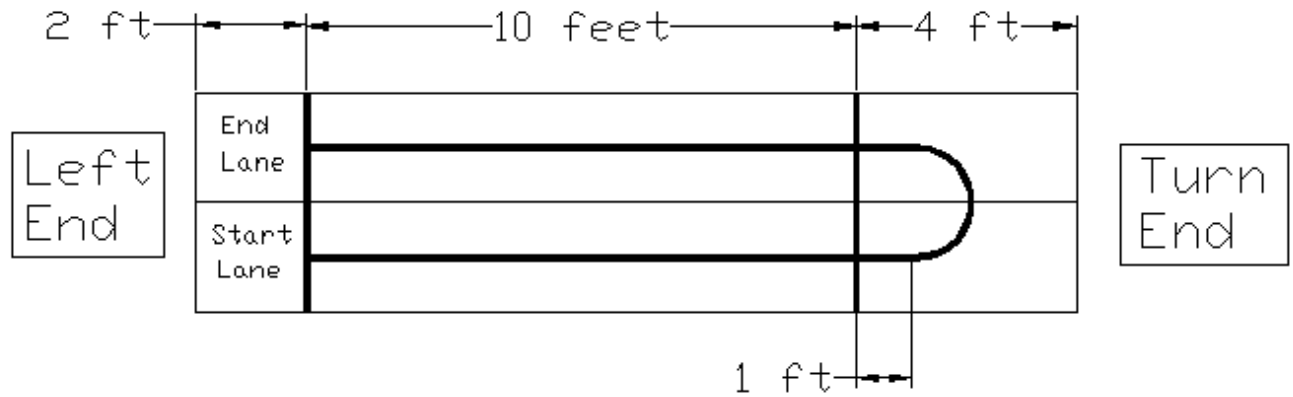
**Vehicle Testing and Testing Surface:**

Before a vehicle can 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 any property or the track will not be allowed in the competition.

Vehicles will be tested on a non-painted, light colored, non-carpeted plywood surface. The 16 ft track shall be formed by placing 2-4x8 ft<sup>2</sup> pieces of plywood end to end to form a surface that is 4x16 ft<sup>2</sup>. Each piece of 4x8 ft<sup>2</sup> plywood shall be cut into two pieces that are 2x8 ft<sup>2</sup>. The pieces will be reattached to a 2x4 that has been placed on its edge to form an elevated center section track that is 8 ft long. The center of the track shall be raised above the floor approximately 3 ½ inches. (The height of a 2x4 on edge)



Top View



The 16 ft length of the track will have four important sections:

- 1- Start Area in Lane 1
- 2- Turn End Area in Lane 2
- 3- Center Straight Lane section ( 10 ft)
- 4- Turn Area at far end of track relative to the start/end areas.

A  $\frac{3}{4}$  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 Center Straight Lane sections. The tape will travel on a straight line from Lane 1 into the turn area 1 ft, form a semi-circle with radius 1 ft, and reconnect on a straight line to the centerline in Lane 2. A start-end line made of  $\frac{3}{4}$  inch black tape will be placed 2 ft from the left end of the track with each vehicle required to start within 6 inches of that line without crossing or touching it in the section marked Start Lane 1. The entire vehicle must travel to and completely enter the turn area, then return completely to the End Lane 2 area. A vehicle's time is measured from the start signal given by the judges until the entire vehicle crosses the start-end line in Lane 2, after having traversed the straight section of the track, completely entered the turn area, and traversed the straight section back to the End Area Lane 2. A  $\frac{3}{4}$  inch black-tape line will be used to mark the beginning of the "Turn End" area. Both ends of the track will have a 2x6 on edge across them acting as a retainer wall. If any part of a vehicle leaves the footprint of the plywood track before coming to rest or fails to completely enter the turn area, it will not receive a time for that trial run. If the vehicle leaves the footprint of the plywood before coming to rest after crossing the start-end line in Lane 2, it will not receive a time for that trial run.

#### Scoring and Test Procedures:

During the competition, 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:

1<sup>st</sup> 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 in the Start Area Lane 1, travel the length of the track, completely enter the turn section, travel the length of the track, and completely enter the End Area Lane 2. After entering the End Area Lane 2, it must come to rest on the track surface. The entire vehicle must stay on the official track surface the entire time. If any part of the vehicle leaves the footprint of the plywood surface at any time, the vehicle will be disqualified for that trial. Decisions of the judges on this matter are final.

**Oral Presentation:**

Prior to the testing of the vehicles, each team shall make a maximum 10 minute oral presentation. The actual length of the presentations may be reduced by the judges if the number of entries does not allow the presentation component of the competition to be completed in a reasonable period of time. The oral presentation will be followed by up to 3 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 team 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 required.

**Scoring:**

The judges will evaluate the content and form of the oral presentation. A copy of the evaluation tool is included. Teams may receive any integer number of points between 0 and 35. The judges may give an equal score to two or more teams.

**PROJECT TEAM / ENTRY LIMITATIONS:**

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.**

**PROJECT INTEREST AND REGISTRATION FORMS:**

Please find the entry forms on a separate page. The Interest Form must be received no later than January 6, 2000. A Registration Form for each model design team must be received no later than June 12, 2000.

**ENTRY SUBMISSION DATE AND TIME:**

All model entries must be submitted at the judging display in the Exhibitor's area before 2:00 PM June 19, 2000. 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 10:30 AM. Specific location will be published within the ASEE Final Program and Proceedings booklet.

Vehicle judging will take place Monday afternoon, June 19, 2000 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 teams will receive plaques.

Please direct questions to:

William C. Beston , Broome Community College, 901 Front St., Binghamton NY 13905  
Phone: 607-778-5344      FAX: 607-778-5334      e-mail: beston\_w@sunybroome.edu  
[http://www.sunybroome.edu/~beston\\_w/ASEE\\_TYCDdesign2000](http://www.sunybroome.edu/~beston_w/ASEE_TYCDdesign2000)