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Annual District SECME OLYMPIAD COMPETITION

DATE: March 12, 2005
Location: TBA

Introduction

The Miami-Dade County Public Schools (M-DCPS) Division of Mathematics and Science Education is pleased to present the District SECME Olympiad Competition. We are excited to have you join us. Registration and check-in will start at 7:30 a.m. and all activities should conclude at approximately 3:30 p.m. We have planned a full day of activities, designed to give students an opportunity to demonstrate skills learned through the Competency-Based-Curriculum in challenging mathematics, science, computer technology, and language arts courses. **Students should come prepared to purchase lunch.**

To the degree possible, this year's theme, *SECME : 21st Century Pioneers - Dreaming Today to Discover Tomorrow*, should be incorporated into each phase of the contest.

Individuals and teams are asked to model the spirit of good sportsmanship. **The decisions of the judges will be final.**

Students are asked to study this handbook and put forth maximum effort in preparing for the competition. As with all competitions, advance preparations will yield a high degree of comfort and confidence. Students should not underestimate their abilities as individuals nor the collective strength of the school's team. Encourage students to represent their school and to demonstrate pride and courage. **In anticipation of increased participation and in order to finish the competition in a timely manner, the number of entries per school has to be limited. Schools are encouraged to hold schoolwide challenges for competition events in order to select representative school teams to enter the District Olympiad.**

Remember, "We all have the potential for greatness!" Tell students to find a niche on the team, remind them that they represent their school's SECME program, and encourage them to have fun!

Good Luck,

The M-DCPS District SECME Team

Dr. Constance Thornton, Administrative Director
Mr. Marcus Anglin, District Mathematics Supervisor
Dr. Gladys Barrio, District Science Supervisor
Dr. Cyd Heyliger-Browne, District Science Supervisor
Mrs. Yuria Orihuela, District Mathematics Supervisor
Dr. Roger I. Blanco, Curriculum Support Specialist
Mrs. Ava D. Rosales, Curriculum Support Specialist
Ms. Elizabeth Travieso, Curriculum Support Specialist

LOGO:



2005 SECME THEME:

“SECME: 21st Century Pioneers - Dreaming Today to Discover Tomorrow”

The 2004-05 theme reflects SECME’s global mission and purpose - to increase the pool of historically under-represented, under-served, and differently-abled students who will be prepared to enter and complete post-secondary studies in science, echnology, engineering, and mathematics, thus creating a diverse and globally competitive workforce. The measure of that accomplishment is a student’s academic and career success.

School Summary of Registered Events

School: _____

SECME Teacher/Coordinator: _____

Principal's Signature: _____

EVENTS

Each school must enter the following competitions: Banner, Essay, Poster, and at least one team event. Please indicate below the categories in which your school will participate.

_____ ¹ **BANNER:** Each school **must enter one** banner which will be displayed in the Parade of Schools (team contest)

_____ ¹ **ESSAY:** Each school **must enter one** essay. Due **January 30, 2004**. Mark Your Calendar! (**individual contest**).

_____ ¹ **POSTER:** Each school **must enter one** poster (**individual contest**).

_____ **MOUSETRAP CAR:** This is a 3-member student team event. **Only one team per school.**

_____ **BRIDGE-BUILDING:** This is a 3-member student team event. **Only one team per school.**

_____ **EGG-DROP CONTAINER:** This is a 3-member student team event. **Only one team per school.**

_____ **BRAIN BOWL:** This is a 4-member student team event. **Only one team per school.**

_____ **MATHEMATICS CHALLENGE:** This is a 4-member student team event. **Only one team per school.**

_____ **COMPUTER CHALLENGE:** This is a 2-member student team event. **Only one team per school.**

_____ **WATER-BOTTLE ROCKET COMPETITION:** This is a 3-member student team event. **Only one team per school.**

STUDENT REGISTRATION FORM

School Code: _____ School Name: _____

Please print the requested information and submit on March 12, 2005 at the Olympiad check-in.

Student ID #	Last Name	First Name	Grade	Event (s)
1.	_____	_____	_____	_____ _____
2.	_____	_____	_____	_____ _____
3.	_____	_____	_____	_____ _____
4.	_____	_____	_____	_____ _____
5.	_____	_____	_____	_____ _____
6.	_____	_____	_____	_____ _____
7.	_____	_____	_____	_____ _____
8.	_____	_____	_____	_____ _____
9.	_____	_____	_____	_____ _____
10.	_____	_____	_____	_____ _____
11.	_____	_____	_____	_____ _____
12.	_____	_____	_____	_____ _____

STUDENT REGISTRATION FORM

School Code: _____ School Name: _____

Please print the requested information and submit on March 12, 2005 at the Olympiad check-in.

	Student ID #	Last name	First name	Grade	Event (s)
13.	_____	_____	_____	_____	_____ _____
14.	_____	_____	_____	_____	_____ _____
15.	_____	_____	_____	_____	_____ _____
16.	_____	_____	_____	_____	_____ _____
17.	_____	_____	_____	_____	_____ _____
18.	_____	_____	_____	_____	_____ _____
19.	_____	_____	_____	_____	_____ _____
20.	_____	_____	_____	_____	_____ _____
21.	_____	_____	_____	_____	_____ _____
22.	_____	_____	_____	_____	_____ _____
23.	_____	_____	_____	_____	_____ _____
24.	_____	_____	_____	_____	_____ _____

General Instructions

1. Check-in starts at 7:30 a.m. and should be completed by 8:15 a.m. in the assigned rooms. Participating schools must be registered with the Division of Mathematics and Science Education SECME district office. Each school must have on file in the district office its complete list of SECME students (Olympiad and non-Olympiad participants).
2. Two students must be in line outside the auditorium with the school's banner at **8:00 a.m.** for the opening ceremony.
3. Some events will run concurrently. To avoid conflicts, an attempt should be made to have different students participating in each event.
4. The bridge, egg-drop container, water-bottle rocket, and mousetrap car will have a higher scoring factor than other events because of the design, construction, and testing phases that are required.
5. All entries in the competitions are expected to be neat, original, and completed by the students participating in this year's Olympiad.
6. Each school must enter the following contests: banner, essay, poster, and at least one team event (Mousetrap Car, Brain Bowl, Bridge-Building, Egg-Drop Container, Math Challenge, Water-Bottle Rocket and/or Computer Challenge).
7. Middle school students will compete with middle school students only. High school students will compete with high school students only.
8. Winners of the various contests will be selected at two levels: middle and senior high. First-, second-, and third-place trophies will be awarded. All participants will receive certificates.
9. Overall Region winners for each level (middle and senior high) will be selected based on total points.
10. Each predesigned project (Bridge, Egg-Drop Container, Water-Bottle Rocket, and Mousetrap Car) must be delivered upon arrival to the appropriate check-in rooms. The packaging must be sufficient to protect the project during normal handling. Each package must be labeled with the following information: school (middle or senior high) and names of team members.

√ Check-In Procedures on the Day of the Olympiad

Upon arrival, the SECME Coordinator/Designee should check-in at the general registration area. Be prepared to submit the following:

- School's Summary of Registered Events Form
 - Student Registration Forms
(All information completed, see pages 5 & 6.)
-

Check the program for room locations; then proceed to the room(s) to submit the following:

- Package(s) containing predesigned project(s)
(Bridges, Mousetrap Cars, Water-Bottle Rockets, Egg-Drop Containers)
 - School's Banner
(Please attach "Title" card.)
 - School's Poster
(Please attach "Title" card.)
-

Description of Events

Note: Middle school and high school students compete separately, i.e grades 6 -8 students compete in middle school events, and grades 9 - 12 compete in high school events.

BANNER

Students create banners based on the Olympiad's theme. Banners must contain the school mascot and SECME logo. Each school must have one (1) entry. Schools will parade with their banners at the opening session of the Olympiad.

BRAIN-BOWL

Students compete against the clock and each other in a contest filled with science questions. Each school may enter one (1) team consisting of four (4) students in the Brain-Bowl competition.

BRIDGE-BUILDING

Students build bass wood bridges to pre-determined specifications. Bridges are then tested at the Olympiad. The winner is determined by the most efficient bridge within the specifications. The high school winner will represent SECME at the International Bridge Contest. Each school may submit **one** preconstructed bridge in this team event.

EGG-DROP CONTAINER

Students build containers that meet pre-determined specifications. At the Olympiad, an uncooked egg is placed in the container and dropped from an initial height of 15 meters. The smallest volume container that protects the egg after being dropped at the final height is deemed the winner. Each middle and senior high school may submit **one** egg-drop container. The eggs will be supplied at the competition.

ESSAY

Students write essays at their schools based on the Olympiad's theme and the best is selected and entered in the District Olympiad. Each school must submit one (1) essay. **Essays are due January 30, 2004. Entries received after that date are not eligible for inclusion in the competition (individual event).**

MOUSETRAP CAR

Students build cars that are propelled by the spring of a mousetrap. All teams must have

- Mousetrap Car (constructed and running)
- Design drawing of Mousetrap Car
- Technical report on Mousetrap Car

A combination of the scores from the race, the report, and the drawing is used to determine the winner. Each school may enter **one** Mousetrap Car.

POSTER

Students create posters based on the Olympiad's theme. Posters must contain the school mascot and SECME logo. Each school may submit only **one** (1) entry.

Description of Events, continued

COMPUTER

Student teams use a webpage editor to create a web page. The winner is the team that scores the highest amount of points based on the assigned task within the allocated time. Each school may enter one (1) team consisting of two (2) students.

MATHEMATICS

Student teams use a variety of strategies to solve mathematics problems using tools such as graphing calculators, calculators, rulers, and manipulatives. The winner is determined by the first team to submit the most correct answers within an hour. Each school may enter one (1) team consisting of four (4) students in the mathematics competition.

WATER BOTTLE ROCKET

Students build a rocket that must meet predetermined specifications. At the Olympiad, rockets will be "fueled" with 355 milliliters of water. The rocket with the greatest combined "hang time" and patch design score will be declared the winner. Each school may enter one (1) rocket built by a team consisting of three (3) students. All teams **must have**:

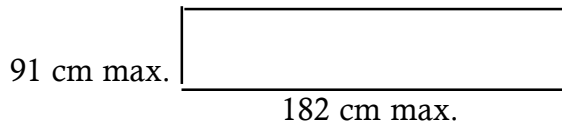
- Water-Bottle Vehicle (constructed and launch-ready)
- Team Patch



BANNER COMPETITION

Requirements:

1. Banners cannot exceed a maximum of **182 cm (centimeters)** wide and **91 cm (centimeters)** high.



2. All entries must include the following information: **school name, mascot and colors, city and state, current year, and SECME logo.**
3. Participation points for banners will be included in overall scores. A separate award will be given for winning banners.
4. All schools participating in the Olympiad must be prepared to have two (2) students parade with their banner at the start of the Olympiad.
5. Banners will be displayed after the judging process.
6. Banners must be a handmade, entirely original work for the year it is submitted.

Judging:

1. Maximum points for a banner are 50.
2. Banners will be scored in the following categories:

Content (10): Quality and organization of information on the banner.

Originality (10): Innovation of design and how well it presents the theme of this year's competition - ***SECME: 21st Century Pioneers - Dreaming Today to Discover Tomorrow***

Creativity (15): Uniqueness of information depicted.

Appearance (15): Attractiveness and neatness, scale and balance of the presentation.

BRAIN-BOWL COMPETITION

General Rules:



1. A team will compete with one or two other teams in a head-to-head competition. All questions will be taken from **earth/space science, biology, chemistry, physical science, and physics**.
2. Middle school teams will compete only against other middle school teams and high school teams will compete only against other high school teams.
3. Scheduling of competing teams will be done by a draw before the end of the opening ceremonies. Preliminary rounds will be by single elimination.
4. A question will be stated only once.
5. Before beginning the match, the judge will ask each contestant to test his or her buzzer. Each team will also designate a captain.
6. The match starts with the toss-up round and is followed by the bonus round. In the toss-up round, the judge will ask the question and an answer must be given without conferring. In the bonus round, the judge will ask a specified number of questions. The team may confer, but only the captain may give the answer.
7. In the toss-up round, any contestant, at any time (interruption of a question is allowed), may buzz in to answer the question. A correct answer will give that contestant's team ten-(10) points. An incorrect answer will result in a five-(5) point deduction from the team's total, and the question will be reread for the opposing team.
8. At the end of the toss-up round, the bonus round will begin. The team with the lower-point total will begin. The number of correctly answered questions from the toss-up round will be the number of bonus questions each team will be asked. When the question is read, the contestants may confer and the team captain may then deliver an answer. A correct answer will receive ten (10) points. There is no penalty for an incorrect answer in this round.

Procedures:

1. The toss-up round is three-(3) minutes. The competition coordinator will call "last question" at the end of the round to signal the round's conclusion. Bonus questions will then follow.

2. Once a toss-up question is read, the contestants will be allowed only five (5) seconds to buzz in. The contestant who signaled is then allowed only five (5) seconds to answer the question. The timekeeper will mark the time from the moment the contestant is recognized at the time of the answer. Exceeding this time limit will be considered an incorrect answer. If a contestant answers the question without being recognized, that will be considered an incorrect answer as well.
3. If a contestant responds during a toss-up question, the moderator will stop asking the question immediately. The person who signaled first must answer the question within five (5) seconds.
 - a. If the response is correct, the team will be duly credited with an opportunity to answer a bonus question at the end of the heat.
 - b. If the response is incorrect, the moderator will repeat the question for the contestants of the other team. The team that presupposed the question may not respond again to this question.
4. If a question is completed and a team's response is incorrect, the other team will have a chance to answer. If the other team's answer is incorrect, the moderator will then ask a new toss-up question.
5. Only the captain may voice a dispute regarding a question, answer, or a procedure. This dispute must be made immediately following the incident. **The judges' ruling is final.**
6. The bonus round is conducted without buzzers. Once the judge finishes reading the question, the team captain has ten seconds to give an answer. If there is a tie at the end of the bonus round, one final sudden-death, toss-up question will be given in order to determine the winner.
7. If at any time during the toss-up round, one team is ahead by more than 80 points over the other, the match will be stopped and the leading team will be declared the winner.
8. If, at the end of the toss-up round, it is clear that one team cannot score enough points to tie the game or to win the game, then there is no need to proceed into the bonus round. The leading team will be declared the winner.
9. The scorekeeper will record the running total of points for each team on a board visible to all contestants and spectators. At the end of each heat, the scorekeeper will record the scores on the competition score sheets. The scorekeeper will then submit the score sheet for each heat to the competition coordinator.

Judging:

1. The value of a toss-up question is ten-(10) points for a correct response and minus five-(5) points for an incorrect response. Therefore, it is possible for a team to have a negative score.
2. Points will not be deducted for an incorrect response to a bonus question.
3. The first team to reach an 80 point advantage (raw score) within a heat or the team with the most points at the end of the round will be declared winner of the round.
4. The question will be stated only once.



2004 Bridge-Building Competition

<http://www.iit.edu/~hsbridge>

These rules have been developed by the International Bridge Building Committee. Questions about these rules may be directed to Ms. Pamela Lorentz by e-mail at plorentz@dadeschools.net and Mrs. Ava D. Rosales by e-mail at arosales@dadeschools.net

The object of this contest is to see who can design, construct and test the **most efficient** bridge within the specifications. Model bridges are intended to be simplified versions of real-world bridges, which are designed to accept a load in any position and permit the load to travel across the entire bridge. In order to allow the contest to proceed in a reasonable amount of time only one loading position is actually tested.

1. Materials

- The bridge must be constructed only from 3/32-inch square cross-section basswood and any commonly available adhesive.
- The official basswood may be notched, cut or sanded in any manner but must still be identifiable as the original official wood.
- No other materials may be used. The bridge may not be stained, painted or coated in any fashion with any foreign substance.

2. Construction

- The bridge mass shall be no greater than 25.00 grams.
- The bridge (see Figure 1) must span a gap (**S**) of 300 mm, have a clearance (**C**) of 100 mm above the support surfaces at the center of the span, be no longer (**L**) than 400 mm, have a maximum width (**W**) of 60 mm and be no taller (**H**) than 250 mm above the support surfaces. No portion of the bridge may project below the elevation of the support surfaces.
- The bridge must be constructed with a slot at least 150 mm long and at least 12 mm wide, centered on the center of the bridge (see Figure 1) to allow the eyebolt connecting the plate to the loading rod to pass vertically through the bridge over the entire length of the slot.
- The loading plane must be horizontal over the entire 150 mm length of the slot such that the bridge may be loaded at any point (i.e. there are an infinite number of loading points). It must be possible to lower the loading plate (see section 3, below) down from above onto any portion of the slot (a length of 150 mm plus an additional 25 mm on each end).

3. Loading

- The load will be applied by means of a 50 mm square plate that is 6.35 mm (1/4 inch) thick (see Figure 2). A 9.53 mm (3/8 inch) diameter eyebolt is attached from below to the center of the plate. The plate must be horizontal when it rests on the loading plane. Masses will be supported on a vertical loading rod suspended from the eyebolt.
- Two edges of the loading plate will be parallel to the longitudinal axis of the bridge.
- On the day of the contest, judges will decide the exact loading location to be used. It will be the same for all bridges

4. Testing

- The bridge will be centered on the supports.
- The loading plate will be placed at the specified loading location.
- The load will be applied from below, as described in section 3 above.
- Loading will continue until bridge failure. Bridge failure is defined as the inability of the bridge to carry additional load, or a load deflection of 25 mm under the loading location, whichever occurs first.
- The bridge with the highest structural efficiency, E , will be declared the winner.

$$E = \text{Load supported in grams} / \text{Mass of bridge in grams}$$

5. Qualification

- All construction and material requirements will be checked both prior to and after testing.
- Bridges which cannot meet the requirements in sections 1, 2 and 3 will be disqualified.
- If, during testing of a bridge, a condition becomes apparent (i.e. use of ineligible materials, etc.) which violates any of the contest rules, that bridge will be disqualified.
- Decisions of the judges are final; these rules may be revised as experience shows the need.

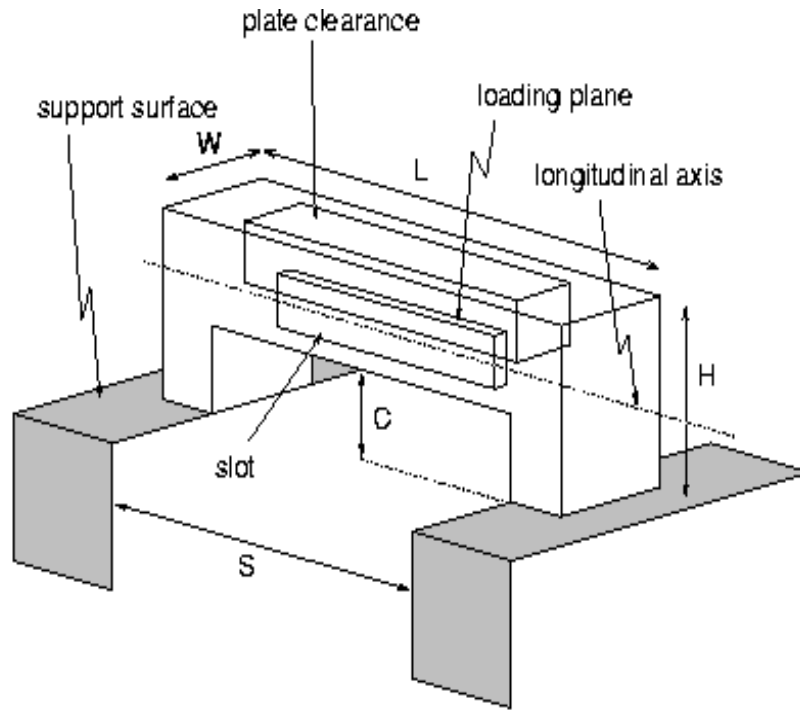


Figure 1. Bridge schematic (not to scale)

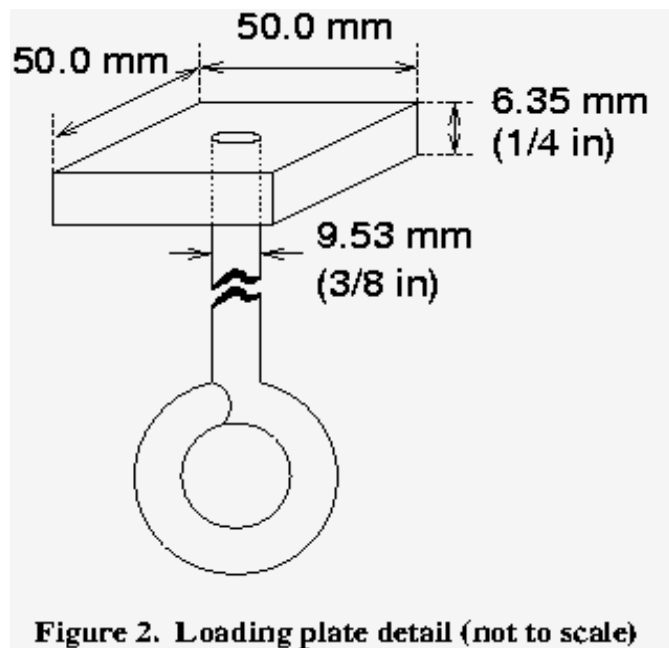


Figure 2. Loading plate detail (not to scale)

BRIDGE-BUILDING COMPETITION

(Registration and Evaluation Worksheet)

ID# _____ Check one: Middle School High School
 Students should complete only the School and Team section below. All other sections will be filled out by the judges and competition administrators.

School Name _____ Team Name: _____

In the event that you place 1st, 2nd, or 3rd, please **CIRCLE** the name of the Team Member who will build the bridge for the International Bridge Competition in April

Team Member #1 _____

Team Member #2 _____

Team Member #3 _____

School Coordinator _____

EVALUATION CATEGORIES:

I. CONSTRUCTION REQUIREMENTS

SCALE	MEASUREMENT	COMMENTS
Weight	M _____	25 grams or less
Height above Support Surface (SS)	H _____	250 mm maximum
Projection below SS	B _____	0 mm
Bridge Length	L _____	400 mm or less
Gap Span	S _____	300 mm
Clearance	C _____	100 mm above SS at center of S
Width	W _____	60 mm maximum
Slot dimension	_____	at least 150 mm long at least 12 mm wide
Slot location	_____	centered on center of bridge

II. SCORING**

Structural Efficiency Score (E) = Load Supported in grams*/Mass of bridge in grams

*Bridges failing with loads greater than 50 kg will be considered to have 50 kg for calculations.

**Failure-includes deflection of 25 mm under the loading point occurs.

Load Capacity (g) _____

Structural Efficiency _____

NOTE: Decisions of the judges are final.

Final Ranking



EGG-DROP COMPETITION

General Rules:

The contestants shall design and build a shipping container that will prevent an uncooked chicken egg (Grade A Large) from cracking when dropped from an initial height of 15 meters. Surviving eggs from the initial drop will then be taken higher and dropped a second time. The container must be less than 800 cm³ in volume, with no single dimension longer than 25 cm. The maximum weight, including the egg, cannot exceed 1,000 grams. Contestants must be able to remove the egg without damage. A maximum of 30 seconds will be allowed to place the egg in the container and remove it.

Materials:

Any material may be used in the design, as long as the structure meets the design requirements and contest rules.

Requirements:

1. No kits or pre-made designs may be used. The structure must be the team's invention.
2. The structure must be completely released (no strings or other attachments). **No parachutes.**
3. The structure must land in a designated target area.
4. No propulsion systems will be allowed.
5. No gases (e.g., helium) other than air can be present in the structure when it is weighed.
6. Inside air space will not be subtracted out. Volume will be calculated based on the shape of the containers.

Judging:

1. Grade A large eggs will be supplied at the contest. You cannot bring your own egg.
2. All containers will be inspected by judges before they are dropped.
3. Once an egg is weighed-in with the structure, that egg cannot be exchanged with another.
4. The egg must be placed into the container on-site. A maximum of 30 seconds will be allowed to place the egg into the container and remove it. Exceeding this time limit will lead to disqualification from the contest.
5. If the egg is damaged during placement in the container, the team will be disqualified.
6. The egg must be undamaged after the drop in order for the value to be recorded.
7. The score will be based on the equation:

$$S2 = \frac{75S}{(W + L^2 + V)}$$

Where S is the success factor with values:

$S = 100$ if egg does not break

$S = 1$ if egg breaks

$W =$ Weight (grams)

$L =$ Longest dimension

$V =$ Volume (cm³)

$S2 =$ Total points value

8. The eggs will be dropped from an initial height of 15 meters; The second and final drop will be from a height greater than 15 meters.
9. The winner will be determined by the team with the highest score ($S2$).

NOTE: Containers must meet volume requirements to qualify for competition.

ESSAY COMPETITION RULES



General Rules:

1. Each entry is to be prepared and submitted by an individual student (not team).
2. An individual middle school student will compete only with other middle school students.
3. An individual high school student will compete only with other high school students.

Theme:

The theme for the 2005 SECME Essay Competition is:

"SECME: 21st Century Pioneers - Dreaming Today to Discover Tomorrow"

Note: Students *must* choose a specific topic within this broad theme.

Requirements:

1. Title Page: Title of Essay (based on the 2005 theme)
Student's name, grade, age
Home address, zip code, and telephone number
Name of school and address, Miami-Dade County Public Schools
School SECME Coordinator's name and date

The title page is to be computer printed/typed page on 8 1/2" x 11" white paper, double spaced with one-inch borders on each side, 12 pt. Times New Roman or CG Times font
2. Essay: **Middle School Student Entry**
Three to four neat computer printed/typed pages, on 8 1/2" x 11" white paper, double spaced with one-inch borders on each side, 12 pt. Times New Roman or CG Times font.

High School Student Entry
Four to six neat computer printed/typed pages, on 8 1/2 x 11" white paper, double spaced with one-inch borders on each page, 12 pt. Times New Roman or CG Times Font.
3. Bibliography: Reference sources and direct quotations are required to be identified as cited. Bibliography is to be computer printed/typed on 8 1/2 x 11" white paper, double spaced with one inch borders on each side, 12 pt. Times New Roman or CG Times font. (Not included in the required page limit for middle and high school essays).

Judging:

Essays will be judged on: Title Page; organization; sentence structure and grammar; mechanics, spelling and punctuation; creativity/style; relationship to competition theme; and bibliography.

1. Maximum number of points is 100.
2. Completed essays should be received in the District SECME office by the end of the workday (4:30 p.m.) on Friday, **JANUARY 28, 2005**. (Attn: Roger Blanco; M-DCPS Division of Mathematics and Science Education, 1500 Biscayne Blvd., Room 327; Miami, FL 33132 or School Mail: 9628, SBAB Annex)

 **Please note: Late entries will not be eligible for competition! Mark Your Calendars!**



MOUSETRAP CAR COMPETITION

GUIDELINES FOR 2005 SECME ENGINEERING DESIGN COMPETITION (MOUSETRAP CAR: CONSTRUCTION AND OPERATION)

ENGINEERING DESIGN COMPETITION REQUIREMENTS:

(Any entry not meeting the following competition requirements will not be eligible for District/overall Region championship titles)

1. The Engineering Design Competition **requires participation in each of these three areas:**
 - a. Mousetrap Car, construction and run
 - b. Design Drawing of Mousetrap Car
 - c. Technical Report on Mousetrap Car
2. This is a **team competition** and should reflect the coordinated efforts of all members.
3. **Three (3) students must be on each team.** Members must remain the same at all levels of competition (school, state/regional site, and national finals).
4. Each team member is expected to be able to serve as a spokesperson and be fully involved with all aspects of the entry.
5. **A standard mousetrap**—usually about 4.5 X 10 centimeters and weighing about 25 grams—**must be used to build the car.**
6. Components of the mousetrap are: base (on which other components are mounted), spring, bail, locking lever, and bait hook (see component sketch on next page).
7. The mousetrap spring must be the sole source of power. **(You may NOT use rubber bands, CO₂ boosters, or any other agent or element for extra power).**
8. **In design and construction of the car, the original mousetrap spring and wood base MUST remain intact.** These two components may **NOT** be cut or altered in any way—physically, chemically, or thermally. Only the locking lever and bait holder may be removed from the base, if desired. **The bail may be straightened but NOT cut (shortened), added on to, or reinforced. It must remain as a component of the completed car.**
9. The spring must be visible and/or accessible to the judges for inspection.
10. The car must have a minimum of three wheels and can be made as long or short as desired as long as requirement #8 above is met.
11. Cars will be tested on a smooth flat surface. **Distance is measured from the starting line to the farthest point of travel, utilizing a straight line to connect the two points.**
12. **There will be two runs for each car; the better run will be used for final scoring of the mousetrap car's performance.**

13. Two formulas are used to calculate the Performance score for the car run:

$$N = \left(\frac{w}{W} \right) X \left(\frac{D}{L} \right)^2 \quad \text{and} \quad F = \frac{N}{N_L} X 100$$

where:

N...is the score.

To ensure that cars actually perform and not just be small and light,

N=0 if D is LESS than 300 centimeters (for middle school/junior high teams)

N=0 if D is LESS than 600 centimeters (for high school teams)

w...is the mass of the original mousetrap (always taken as 25 grams). NOTE: At all competitions, this standard value will be used in calculating the Performance score.

W...is the total mass of the completed car in grams.

D...is distance measured in a straight line from the starting point to the stopping point in centimeters. D=2,500 if the car travels 2,500 centimeters or more.

L...is the car's longest dimension in any direction (not necessarily the length) in centimeters, measured with the bail extended or retracted, whichever is greater.*

N_L...is the highest Performance score at the competition site

F...is the final Performance score (to be combined with scores for the Design Drawing, and Technical Report).

**Judges will measure “L” (see illustration on following page) and “W” prior to the mousetrap car Performance runs. These measurements, together with “D” (determined by the car's run), are used to calculate “N” in the formula above.*

14. Overall Team Score in competition is sum of: 1) Performance (car run) as calculated above (max. 100 points); 2) Design Drawing (max. 50 points); 3) Technical Report (max. 50 points) . **Thus the maximum total is 200 points.**

(Note: refer to sketch on page 27-28 for guideline sketches)

Component Sketch of Original Mousetrap

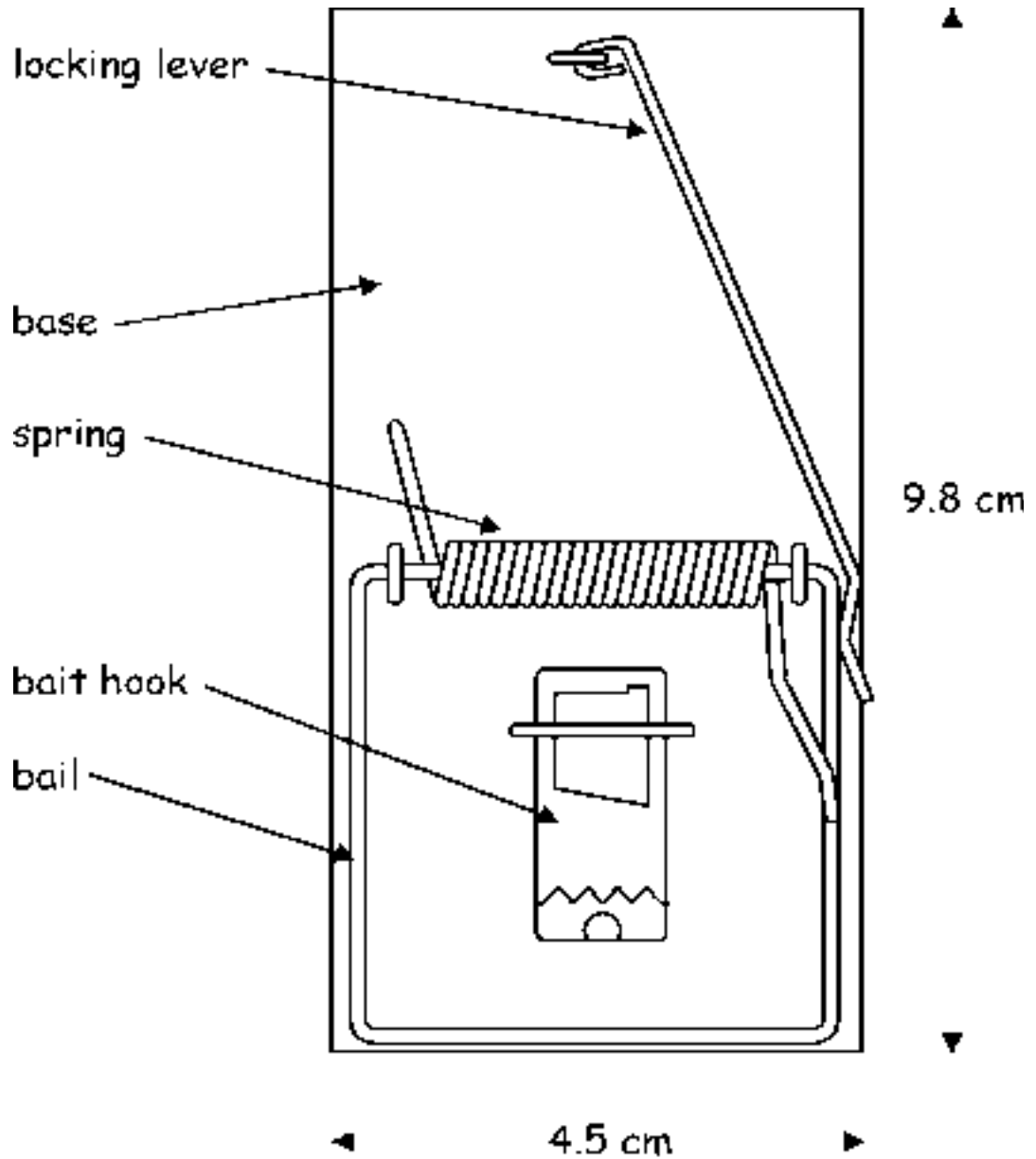
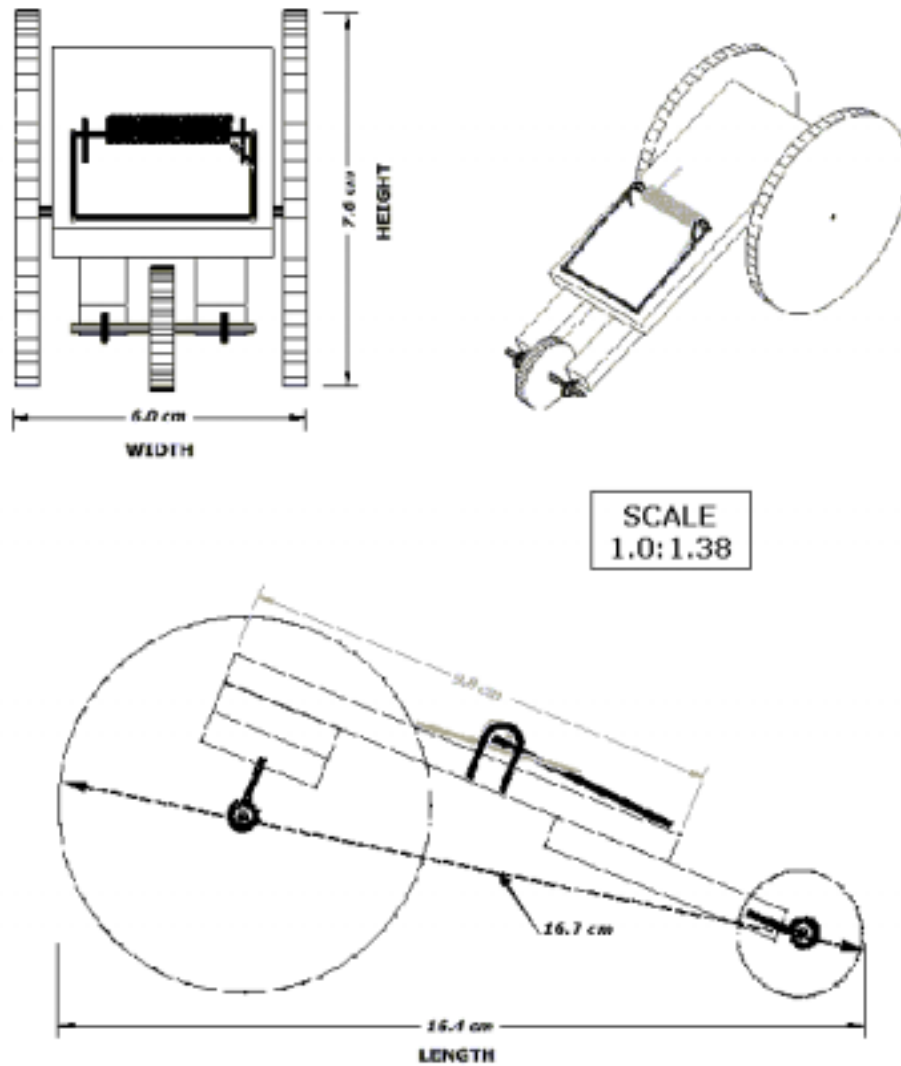


Illustration of Measured Length, Width, and Height To Determine Mousetrap Car’s Longest Dimension, “L”



“L” is the car’s longest measurement along one of the three basic dimensions—length, width, or height—in centimeters with the bail extended or retracted, whichever is greater. The length of the car is defined as the distance from the furthest point at the rear of the car to the furthest point at the front. Likewise, the width of the car is defined as the distance from the furthest point on one side to the furthest point on the other. The height of the car is defined as the distance from the travel surface to the highest point of the car.

L (for this example) = 16.7 cm



MOUSETRAP CAR COMPETITION DESIGN DRAWING RULES

As a part of the design competition, the team is required to prepare a scaled drawing depicting the car they have designed and built.

The Mousetrap Car Drawing entry is required to illustrate the actual mousetrap car built by the team (photographs and computer generated drawings will NOT be allowed).

2. The size of the engineering paper is required to be the standard (plain, non-grid) 18" X 24" sheet. (Allowing for the required 1" border on all sides, the actual drawing is to cover an exposed area of 16" X 22" of the paper.) **NO MOUNTING, NO FRAMES ALLOWED. BUT DRAWING MAY BE LAMINATED FOR PROTECTION IF DESIRED.**
3. All dimensions are required to be illustrated on the drawing.
4. The scale and the units are required to be indicated on the drawing.
5. The team's Mousetrap Car Drawing is required to show frontal, side, and rear views.
6. All parts of the car are required to be labeled.
7. Ink pens, pencils or markers may be used.
8. A 4" x 6" title card with the following information is required:

Team name
School Name and Address
Team Members' Names, Addresses, and Grade Levels
School Coordinator's Name
Date of Competition

AT ALL COMPETITIONS, THE MOUSETRAP CAR DRAWING WILL BE JUDGED ON:

RESEMBLANCE (Between the actual mousetrap car and drawing)
SCALE
NAMING/LABELING (Of all of the parts used)
APPEARANCE/NEATNESS

MOUSETRAP CAR COMPETITION WRITTEN TECHNICAL REPORT RULES

1. As a part of the Design Competition, the team is required to write a Technical Report describing the design, construction, and operation of the mousetrap car. The Technical Report should be a computer-printed/typed document on 8 1/2" X 11" white paper with **one-inch borders** at the top, bottom, and on each side.
2. Use **12 pt. type** in a standard legible text font.
3. The main body of the report--**4. Introduction, 5. Design Construction, 6. Construction Procedure, and 7. Operation of the Mousetrap Car**--should be a maximum of 5 pages total.
4. Drawings, sketches, and tables may be included in an appendix, if desired, but this is optional and not required.

TECHNICAL REPORT REQUIREMENTS AND GUIDELINES:

- | | |
|--------------------------------------|---|
| 1. Cover page (required to contain): | Title of the Technical Report
a. Names, addresses, and grades of team members
b. Team's school name and address
c. School system name
d. School Coordinator's name
e. Date |
| 2. Abstract | One-half to one-page summary of the technical report |
| 3. Table of Contents | One page |
| 4. Introduction | |
| 5. Design Construction | |
| 6. Construction Procedure | |
| 7. Operation of the Mousetrap Car | |
| 8. Conclusion/Recommendations | |
| 9. Acknowledgments (optional) | |
| 10. Appendix | <i>May contain sketches, tables, and charts.</i> |

Maximum five (5) pages

POSTER COMPETITION RULES



General Rules:

1. Each entry is to be prepared and submitted by an individual student (not team).
2. An individual middle school student will compete only with other middle school students.
3. An individual high school student will compete only with other high school students.

Theme:

The theme for the 2004 SECME Competition is:
"SECME: 21st Century Pioneers - Dreaming Today to Discover Tomorrow"

The 2005SECME theme must appear on the poster.

Requirements:

1. Title Card 4" X 6"
Title of poster: **MUST** be this year's theme
Student's name, grade, age
Home address, zip code and telephone number
School name and address, Miami-Dade County Public Schools
SECME School Coordinator's name, Date
2. Poster
The size of the poster is required to be 22" X 28" (including frame). **All posters must be framed in standard 22"X28" black, slide-on metal or plastic poster frames.** Framed posters are not to use glass. **The theme must appear on the poster.**
Poster must be an original work using any medium:
 - cut and paste
 - hand-drawn (paints, charcoal, markers, crayon)
 - computer (complete work cannot be computer-generated)
 - or any combination of the above.

*Lamination may be used to protect posters during transport
(Three Dimensional Posters are NOT ALLOWED)*



MIDDLE SCHOOL COMPUTER CHALLENGE RULES

Software: *Netscape Composer*
Time: 2 hours

Each school may enter one (1) team consisting of two (2) students in the computer contest.

This is a team competition that will require students to work cooperatively to complete a comprehensive task. Students will need to read directions and comprehend the instructions. They will then discuss the tasks to be performed, collaborate on the approach(es), and complete the assignments.

This year's computer competition will have students create a simple web page. **All students will work offline. There will be no access to the Internet.** Some of the tasks that will be asked of the students may include the following:

- Change backgrounds, font colors, and sizes. (10 pts)
- Create hyperlinks. Be sure to understand the difference between absolute and relative links! (10 pts)
- Insert, resize, and link images. (15 pts)
- Align text and images. (10 pts)
- Create tables. (20 pts)

Other points will be given based on the following:

- **Content:** The web page should contain the necessary information as indicated in the task. (10 pts)
- **Visual Appeal:** Teams should have an understanding of good web design. (25 pts)

Students must keep copyright laws in mind. (*Teams with copyright infringements may be penalized 5-100 pts, depending on the severity of the copyright infringement.*)

Maximum score: 100 pts.

Netscape Composer will be installed on competition computers.

NOTE: Decisions of the judges are final.



HIGH SCHOOL COMPUTER CHALLENGE RULES

Software: *Netscape Composer*
Time: 2 hours

Each school may enter one (1) team consisting of up to two (2) students in the computer contest.

This is a team competition that will require students to work cooperatively to complete a comprehensive task. Students will need to read directions and comprehend the instructions. They will then discuss the tasks to be performed, collaborate on the approach(es), and complete the assignments.

This year's computer competition will have students create simple web pages. **All students will work offline. There will be no access to the Internet.** Some of the tasks that will be asked of the students may include the following:

- Change backgrounds, font colors, and sizes. (5 pts.)
- Create hyperlinks and anchor links. (10 pts.)
- Insert images. (10 pts)
- Align text and images. (10 pts.)
- Create tables. (15 pts)
- Create pages using frames. (20 pts.)

Other points will be given based on the following:

- **Content:** The web page should contain the necessary information as indicated in the task. (10 pts)
- **Visual Appeal:** Teams should have an understanding of good web design. (20 pts)

Students must keep copyright laws in mind. (*Teams with copyright infringements may be penalized 5-100 pts, depending on the severity of the copyright infringement.*)

Maximum score: 100 pts.

Netscape Composer will be installed on competition computers.

NOTE: Decisions of the judges are final.

MATHEMATICS CHALLENGE RULES



Time: 1 hour

Each school may enter one (1) team consisting of four (4) students in the Mathematics Challenge. **There will be separate competitions for middle and high school students.**

This is a team competition that will require students to work cooperatively to complete a comprehensive task.

CONTEST RULES:

1. Each student will be asked to read, comprehend, and analyze scenarios to solve problems. They will then discuss their findings among the team members.
2. The following skills may be involved: following directions, management of information, using different units, comparing and combining information, determining or eliminating data, constructing graphs, data tables, and charts, calculating essential data, and creating model representations.
3. Teams should be prepared to respond to scenarios using knowledge and procedures from various mathematics courses (**Middle School:** Algebra, Geometry; **High School:** Algebra, Geometry, and Pre-calculus).
4. Teams will be asked to make connections across the disciplines and identify real-world connections.
5. Teams will also be asked to provide justifications or explanations at various points.



WATER-ROCKET VEHICLE COMPETITION RULES

The Mission:

The mission is to design a Water-Rocket Vehicle capable of reaching the highest altitude possible given a specific launch criteria to achieve the longest hang time. The objective of the contest is for each team to construct a rocket propelled by water and air which will be launched at approximately a **90 degree angle** to reach the maximum height possible and maintain the longest "hang time."

Design and Contest Rules:

1. Each design team must consist of three (3) students.
2. On the day of the competition a **completed entry form, an actual operating rocket, and a patch design must be submitted to qualify for the event and to compete.**

Note: At this time, each entry must pass a visual inspection and height requirement in order to be eligible to compete. Entries that fail inspection will be given ONE opportunity to make modifications to pass inspection prior to the beginning of the water rocket launching competition.

3. An overall winner will be judged, upon the following criteria (based on 100%):
>Hang Time of Rocket **70%**
>Patch Design **30%**
4. The rocket will be launched at an angle of approximately a **90 degree** using **355 ml (milliliters)** of water and 60 psi of air pressure. The "hang time" of the rocket will be measured using a stopwatch.
5. The "hang time" is defined as the time from the point when the **rocket leaves the launch pad until the time it reaches the ground.** This measurement will be recorded by at least three qualified judges, with the average "hang time" used to determine the final score.
6. The final score for hang time will be calculated based on the greatest single hang time recorded during the competition, using the following formula:

$$\frac{\text{average hang time (sec)}}{\text{maximum hang time (sec)}} \times 100$$

Construction and Operation Requirements continued:

1. The pressure vessel must be ONE (1) clear plastic, 2-liter bottle (i.e., no colored bottles allowed).
2. Water and air pressure will be the sole source of propellant. At check-in, the water volume (**355ml**) will be measured and placed in the rocket fuel chamber.
3. **Metal, glass, or spikes cannot be used to construct the rocket. Use of these materials will automatically disqualify the team from the competition.**
4. On the bottom of the rocket, 7.5 cm from the throat of the exit plane must be clear of any coverage (paint, markings, drawings, etc.). See Diagram 2.
5. The maximum allowed total height of the rocket is 76.0 cm. See Diagram 2.
6. The nose-cone tip must have a minimum radius of 1.5 cm. See Diagram 3.
7. The fins must start 10 cm from the throat of the exit plane. See Diagram 2.
Note: No forward-swept type of fins are allowed to be used on the rocket.
8. The maximum fin-width distance from the bottle is 10.0 cm (or 16.5 cm from the center of the bottle axis), see Diagram 4.
9. The use of parachutes is NOT allowed.

PATCH DESIGN CRITERIA:

1. Patch designs must be submitted on a 13” x 13” poster board.
2. All entries must contain the team name, crew members’ names, and follow the theme of this year’s SECME competition: **“SECME: 21st Century Pioneers - Dreaming Today to Discover Tomorrow”**
3. Patches must be hand-made original work prepared and submitted by the SECME School Team who will be participating in the Water-Rocket Design Competition. Ink pencils, markers, or paint may be used.
4. Participating teams must be prepared to display their patches prior to the launch of their rockets.
5. Each entry is to be submitted by the mission captain along with the rocket at the time of check-in. A patch should be clipped to the outside of the bag containing the rocket.

Diagram 2

Rocket Identification

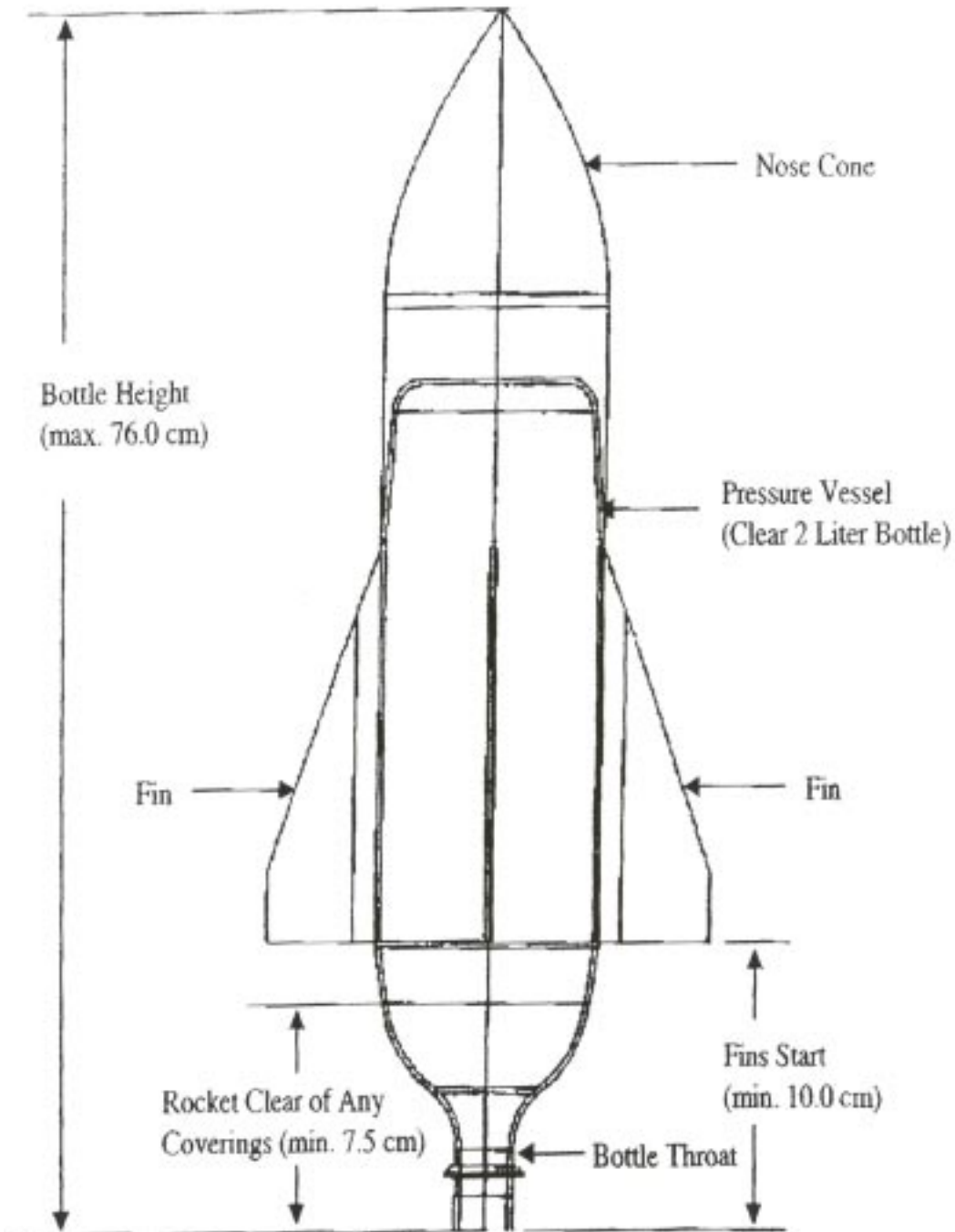


Diagram 3

Nose Cone Diagram

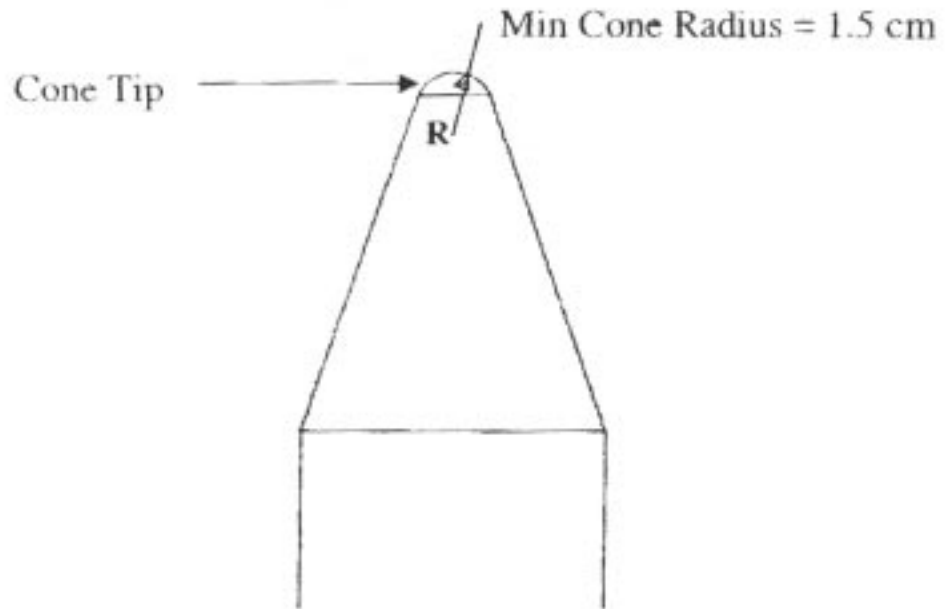
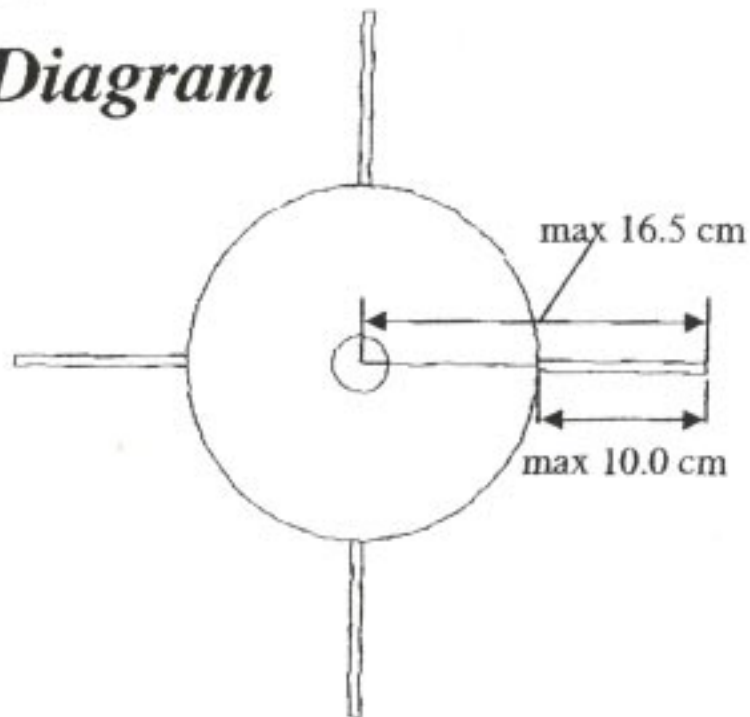
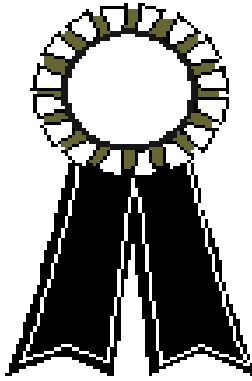


Diagram 4

Fin Diagram





AWARDS

All participating students will receive certificates. First-, second-, and third-place trophies will be awarded for each event at each level (middle and high school)during the Annual Awards Breakfast Banquet held in May. All participating schools will be invited to the ceremony. Additionally, first-, second-, and third-place trophies will be awarded to the overall winning teams at the middle and senior high levels for each school Region.



NATIONAL SECME COMPETITION AND INTERNATIONAL BRIDGE COMPETITION

Each year, selected District Olympiad projects are entered in the **National SECME Competition** and the **International Bridge Competition**. Students are responsible for adhering to the National and International rules, which may vary slightly from the District competition, due to late clarifications and/or changes by the respective competition hosts.

National SECME Competition

Both middle and high school winning projects in the following events are scheduled to be sent to the National Olympiad:

- **Mousetrap Car** (along with the School's **Banner**)
- **Poster**
- **Essay**

Although three (3) projects are sent to the National Student Competition, held this year in Houston, Texas, **only the students on the winning mousetrap car team** are invited to travel to the competition and participate in the student program. The District and the National SECME offices provide travel, housing, and meal expenses.

Should the winning mousetrap car team DECLINE participation in the national competition, notification of such action MUST reach the District SECME office prior to April 5, 2005. It is important that each winning school understand that last minute cancellations will cause a financial loss for the school system and would deprive a fellow school of representing the district at the national competition.

(Note: First place Poster and Essay winners are identified prior to the National Mousetrap Competition, and will be invited to the National Student Program, all expenses paid, to accept their awards.)

International Bridge Competition

Two (2) **individual*** Bridge competition winners, from first - third place, will be invited to participate in the **International Bridge Competition** held this year on **April 23, 2005** in Chicago, Illinois.

(*Please note: The International Bridge Competition is an individual event and not a team competition.)

The Yaeger Foundation, Inc.

Bionic / Robotic Hand Kit Competition

(An exposition event at the Miami-Dade District SECME Olympiad)

Grade Level: High School only

THE CHALLENGE - Your team will act as founders of a new biomedical company that is pursuing a large U. S. Government prosthetics contract. To win the contract, your company must redesign the Mark I, an existing electric bionic hand. You will be provided with the parts and instructions to build the Mark I. Your team must find ways of improving the function and appearance of this "Hand" without exceeding a fixed budget. The team must complete a functioning prototype and presentation.

THE COMPETITION - Your team will compete against other teams by demonstrating re-engineered hands to a panel of judges for final evaluation. Prizes will be awarded in categories such as Product Demonstration and Innovative Engineering.

ELIGIBILITY - Teams of 2 to 4 students, high school only.

High schools wishing to participate in this competition should contact The Yaeger Foundation, Inc. at:

telephone: 305-751-4208

by e-mail: IG500@aol.com

street address: 1177 M. L. King Boulevard, Miami, FL 33150

Questions about this event may also be sent to Mrs. Ava D. Roslaes by e-mail to:

arosales@dadeschools.net