2019 2020

SECME INC.

Diversity in STEM Education

STEM CHAMPIONS

2019-2020 National Student Competition Guidelines

Letter to our Competition Hosts

Dear SECME Educators and Competition Hosts:

Welcome to the 2019-20 SECME Competition year. This packet contains guidelines for the 2019-20 SECME National Student Competitions. We trust this year's guidelines will truly *bring out champions* in the young people in the communities you serve. These guidelines serve as the framework for your local, state and/or regional SECME competitions. In addition to hosting the SECME competition, many of you provide technical assistance to schools and districts by way of SECME workshops for teachers to learn basic SECME competition (Mousetrap Car, Water Bottle Rocketry, VEX EDR Robotics, VEX IQ, and Solar Car) skills or other STEM content, and the SECME National Office staff stands ready to assist in ensuring that you have the information and resources you need for an exciting experience for students.

SECME STEM competitions are aligned to National Standards which can be drilled down to your state standards. We hope that this will allow you to integrate competition readiness activities into your classroom learning and extended learning periods and utilize them to demonstrate the application of important math and science skills in real-world situations.

We invite you, SECME educators, administrators, member university and industry partners to participate in the 44th Annual SECME Summer Institute in June. Educators receive state-of–the-art professional development and competition readiness skills, while all others participate in SECME's STEM Pipeline Diversity Summit. All communities will come together to enjoy the 2019 SECME National Student Competition Finals. This year's Institute will be hosted by The University of Alabama in Tuscaloosa, AL.

We have made several changes to the structure of the 2019-2020 SECME Competition Guidelines so we encourage you to read the Guidelines carefully. Remember that REGISTRATION (formerly Certification) of winning teams closes **Friday, April 10, 2020.** The registration link will be available **Monday, March 2, 2020**. After we receive all registrations, the 2019-20 SECME National Student Competitions winners for non-traveling teams will be posted on our website (www.secme.org). We look forward to hosting your traveling team 1st place winning teams at the 2019-20 SECME National Student Competition Finals and working with you to enhance your local SECME program and competitions.

Thank you for your partnership and for your commitment to equity and excellence in STEM education. Have a wonderful school year!

Sincerely,

Dr. Julaunica Tigner
Training Outreach Coordinator

Note: We hope you will find these Guidelines error-free; however, typos and mistakes do happen and occasionally these are not caught by our team. I apologize in advance if you find any typo, error, mistake, etc. Please bring the situation to my attention by emailing me at julaunica.tigner@coe.gatech.edu. Addendum/s to the Guidelines, if necessary, will be located on the SECME website under Newsfeed.

TABLE OF CONTENTS

Pages

COMPETITION INFORMATION 6

IMPORTANT DEADLINES 7

GENERAL COMPETITION INFORMATION 8

What information is required to REGISTER? In order for the Competition Host to REGISTER their 1st place winning SECME students/student teams, you will need the following information: 9

Code of Conduct/Competition Behavior 9

Eligibility Criteria 10

Recommended Financial Responsibilities for SECME Student Competition Partners 11

Required Reporting Documents Checklist – BY COMPETITION 13

Required Reporting Documents Checklist – BY DIVISON 14

Required Documents Checklist – BY SECME COORDINATOR - BYDATE 15

NEW: How to submit Essay/Vision Boards, Vision Board Video, Written Reports, Technical Reports, PowerPoint Presentations or Engineering Notebooks 16

MOUSETRAP CAR (MTC) 18

Construction and Operation – Mousetrap Car ALL DIVISIONS 19

Measurement of "L," the Mousetrap Car's Longest Dimension 20

Construction and Design Requirement (MTC) – ALL DIVISIONS 21

ELEMENTARY SCHOOL DIVISION (MTC) 23

Calculation of Mousetrap Car Score-Elementary School Division 24

MIDDLE AND HIGH SCHOOL DIVISION (MTC) 26

Calculation of Mousetrap Car Score - Middle & High School Division 28

VEX EDR AND VEX IQ ROBOTICS 30

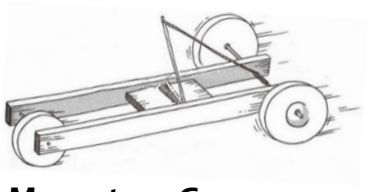
MIDDLE/HIGH SCHOOL (VEX EDR) 32

ELEMENTARY SCHOOL (VEX IQ) 34

THE ART OF ENGINEERING (AOE) 36
WATER BOTTLE ROCKETRY 38
Construction and Operation (WBR)- ALL DIVISIONS 40
Water Bottle Rocket Identification Diagrams 41
Water Bottle Rocket Nose Cone Diagram 42
Water Bottle Rocket Fin Diagram 42
Patch Design Challenge (WBR) – All Divisions 43
Water Bottle Rocketry-Elementary School Division 45
Calculation of Water Bottle Score (WBR) – Elementary School Division 46
Water Bottle Rocketry – Middle/High School Division 47
Calculation of Water Bottle Rocket Score (WBR) - Middle and High School Division 48
Essay/Vision Board Competition Guidelines 49
Grades PreK-2 50
Grades 3-12 50
Phase 1: Interest Inventory 52
Phase 2: Career Search 53
Phase 3: Education Research and Fun Facts about SECME and its University Partners 54
Phase 4: Essay 55
Phase 5: Vision Board 56
APPENDIX - FORMS & REPORTNG 57
Acceptable Fonts and Sample Cover Page - All Competitions. All Divisions 58
Sample Cover Page 58
Mousetrap Car Materials List 59
Written Report Evaluation Instructions (MTC & WBR) - Elementary School Division 60
Written Report Judges Evaluation Form (MTC/WBR)– Elementary Division 61
Technical Report Evaluation Instructions (MTC & WBR) - MIDDLE & HIGH SCHOOL 62

Technical Report Evaluation Breakdown (MTC & WBR)- Middle & High School Division 63
Technical Report Judges Evaluation Form (MTC & WBR) – MIDDLE/HIGH SCHOOL 65
Engineering Notebook Evaluation Instructions (VEX EDR and VEX IQ) 66
Engineering Notebook Judges' Form (VEX EDR /VEX IQ ROBOTICS) 67
PowerPoint Presentation Evaluation Instructions 68
PowerPoint Judges Evaluation Form (MTC) - Middle & High School 69
PowerPoint Judges Evaluation Form (VEX EDR/WBR) - Middle & High School 70
Technical Drawing Evaluation Instructions – Middle/High School Division 71
Technical Drawing Judges Evaluation Form - Middle & High School Division 72
Patch Design Challenge Judges Evaluation Instructions (WBR) – All Divisions 73
Patch Design Challenge (WBR) – Judges Evaluation Form 74
Construction and Operation Judges Evaluation Form (MTC)- ELEMENTARY 75
Construction and Operation Judges Evaluation Form (MTC) – MIDDLE/HIGH SCHOOL 76
Construction and Operation Judges Evaluation Form (WBR) - ELEMENTARY 77
Construction and Operation Judges Evaluation Form (WBR) –MIDDLE/HIGH 78
JUDGES EVALUTION INSTRUCTIONS (AOE) 79
Judges Evaluation Form (AOE) 80
Essay/Vision Board Judges Evaluation Instructions – ALL DIVISIONS 81
SECME Essay/Vision Board Judges' Evaluation Form - Grades PreK-2 82
SECME Essay/Vision Board Judges' Evaluation - Grades 3-12 83
Consent form for the use of photographs or video 84
Minor and Adult Room Waiver 85
Grievance Form 86
Definitions Page 87
Frequently Asked Questions 89
SECME Partner National Competitions 92

COMPETITION INFORMATION



Mousetrap Car

New Game ….

New Game ….

IMPORTANT DEADLINES

All announcements of changes and/or updates will be published on the SECME website News page.
Details on electronic submissions can be found in the Definitions Page

November 1, 2019 – Competing schools must be registered with the SECME National Office

January 7, 2020 – Competing students must be registered with the SECME National Office

March 2, 2020 – Registration Opens. All competition hosts are to REGISTER (formerly Certification of Competition Winners) their SECME State/District/Regional 1st place winners. Registration of 1st place winners includes electronically uploading the following reports: (see Definitions Page for additional details)

Non-Traveling 1st Place SECME Winners

- Elementary Mousetrap Car Written Report
- Water Bottle Rocketry Written and Technical Report due (All Divisions)
- Essay/Vision Boards (All Divisions)
- VEX IQ Robotics Engineering Notebooks

Traveling Team 1st Place SECME Winners (Middle and High School student teams)

- Mousetrap Car Technical Reports
- Mousetrap Car PowerPoint Presentations
- VEX EDR Robotics Engineering Notebooks
- VEX EDR Robotics PowerPoint Presentations

April 10, 2020 – Registration Closes.

April 24, 2020 -The following documents are to be submitted by the SECME School Coordinator for all National Competition 1st Place winners for inclusion on our website and other marketing material:

- Consent form for the use of photographs or video
- Minor and Adult Room Waiver
- Photo of the winning student (essay/vision board)
- Photo of the winning student team (all divisions, mousetrap car, VEX IQ Robotics, VEX EDR Robotics, water bottle rocketry)
- **Student Surveys due for ALL competing students (on-line survey to be completed by each student)**

May 4, 2020

- Notification of Winners. ALL SECME Non-Traveling SECME student and student team competitors will be notified and a listing of winners will be posted on the SECME website.
- SECME School Coordinators must identify and register their traveling team/s chaperone information.

June 2020

- SECME Engineering Design National Student Competition Finals at University of Alabama.

GENERAL COMPETITION INFORMATION

Please read the 2019-2020 National Student Competition Guidelines in their entirety. Any alterations to these guidelines are prohibited. If you are a SECME competition host that combines or adds these guidelines to your local SECME competition guidelines, to prevent confusion, please keep the content in these guidelines separate from your SECME local requirements.

***New Features* for 2019-2020**

- Materials Budget Requirement – Mousetrap Car Only
- New non-qualifying competition – "VEX IQ Robotics" (non-traveling)
- Competition Hosts will REGISTER all 1st Place winning SECME students and student teams (formerly Certification)
- Essay and Vision Board (Pre-K – 2nd) will submit a 2-4-minute explanation video
- Description of Vision Board (3rd -12th grades) required
- Dress code for the Art of Engineering
- Housing permission slip for SECME high school teams
- SECME Students' Sportsmanship and Code of Conduct Pledge
- Easier to use Guidelines

SECME engineering design competitions are meant to challenge SECME student team participants to "think like engineers." Vehicle/project designs, written reports, visual aids, and construction of vehicles should be solely the work of SECME student participants. SECME students will be asked to verify this during competition events.

Competitions are a wonderful way for teachers to reinforce science, technology, engineering, and mathematics skills with exciting, hands-on activities while challenging students to persevere and excel. SECME student competitions are designed to expose students to a variety of real-world applications for science and math in a respectful and professional manner while generating interest and excitement about college and careers in **STEM**.

Following are the 2019-2020 SECME National Student Competitions Guidelines. New engineering and artistic twists and turns have been added to awaken the minds of our young people to make this year's competitions more fun and challenging. Activities, deadlines and SECME competitions at the Local/State/Regional Competition level are at the discretion of the SECME Member University or Host Sponsor. We encourage participation at all levels or divisions (elementary, middle and high schools).

SECME's 4 National Student Competitions

- Engineering Design Competitions
    1. Mousetrap Car
    2. Water Bottle Rocketry
    3. VEX EDR Robotics
    4. VEX IQ Robotics
- Essay/Vision Board Competition (1)

GENERAL COMPETITION INFORMATION – con't

What information is required to REGISTER? In order for the Competition Host to REGISTER their 1st place winning SECME students/student teams, you will need the following information:

1. Student's full name (first and last)
2. Official School Name, Official School District
3. Gender
4. Grade
5. Email address
6. Team Name (if team)
7. SECME Coordinator (teacher-1st and last) name
8. SECME Coordinator email & mobile number

Code of Conduct/Competition Behavior

Unsportsmanlike Behavior - Each student, teacher (or coordinator), chaperone, and parent works hard during the school year to prepare for competition. To honor their hard work and dedication; and to contribute to an exciting environment, repeated or egregious violations of the expectations in this Code will result in disqualification of your SECME team.

We expect the following behavior and ethical standards at the SECME Engineering Design National Competition Finals. These behaviors will be monitored and observed.

- Act with integrity, honesty, and reliability
- Behave respectfully and professionally with event staff, volunteers, and fellow competitors
- Exhibit maturity and proper decorum when dealing with difficult and stressful situations
- Respect individual differences
- Follow all rules as listed in the current guidelines
- Only student team members may make adjustments/repairs to competition vehicles; and decisions related thereto. (While adults may mentor teams, no adult or non-team member should physically alter the competition vehicle)
- Safety is a top priority
- Good sportsmanship, which includes supporting all competing teams
- As guests of The University of Alabama, respect and care for University property and facilities

These expectations apply to all SECME student team members and all adults associated SECME, including, but not limited to teachers (coordinators), mentors and parents.

Collaboration:

To foster collaboration and a knowledge-sharing STEM community, all materials submitted to SECME for national competitions will become the property of SECME and may be shared via the SECME website, marketing documents, presentations, etc. Materials include, but are not limited to, technical reports, engineering notebooks, pictures, technical drawings, etc.

Consent to use photographs:

When uploading photographs, we have included a parent/guardian consent form to be uploaded. Consent Forms are located in the Appendix.

Eligibility Criteria

PLEASE READ CAREFULLY

1. SECME School Coordinators, your 2019-20 school and student data must be entered electronically into the SECME National database as follows:
    a. Competing schools must be registered with the SECME National Office by **November 1, 2019**. New SECME participating schools starting after November 1 must have their registration completed within 7 days of receiving their Welcome Letter. Existing schools must update their information with the SECME National Office (SECME Database System) by **November 1, 2019**.
    b. SECME School Coordinators are encouraged to register/update all students participating in SECME. However, ***ALL*** students participating in SECME National Student Competition Finals must be registered/updated in the SECME National Database System by **January 7, 2020**. Students will not be eligible to advance to National Student Competition Finals unless they are registered with the SECME National Office.
    c. SECME School Coordinators. All competing SECME student teams (local, state/regional and national event) should submit their reports and engineering notebooks, according to their SECME competition event. However, **ALL first place winning teams MUST** submit reports and engineering notebooks by **April 10, 2020**. If reports and/or engineering notebooks are not received by the deadline, these teams will receive a zero point score for the designated category in the SECME National Competition Finals.
    d. SECME School Coordinators are to encourage their SECME participating students to complete the electronic SECME Student Survey. However, ***ALL*** students participating in SECME National Student Competition Finals must complete the electronic Student Survey not later than **April 24, 2020.** Students will not be eligible to advance to National Student Competition Finals unless they have completed the SECME Student Survey.
2. SECME Member Universities, Program Directors, and School Coordinators are asked to distribute (or reference) these Guidelines to ***all*** (educators, parents, business/industry partners, graduate and undergraduate students) who will help prepare students for this year's competitions or serve as mentors and/or judges. It is important that ***all*** fully understand the judging criteria for **each Competition and their division.**
3. All entries are expected to be neat, original, and **completed by the SECME students only**.
4. Elementary, Middle and High School SECME students will compete with other SECME students at their respective levels.
5. 1st place SECME State/Regional winning student or student teams, as identified in these guidelines, will be eligible to advance to the 2019-20 SECME National Student Competition Finals.
6. 1st place SECME State/Regional winning students and/or student teams participating in elementary Mousetrap Car, Water Bottle Rocketry, VEX IQ Robotics and Essay/Vision Board **DO NOT TRAVEL** to compete in the SECME National Student Competition Finals. National winners are chosen by score elimination. Scores from 1st place State/Regional competition winners will be submitted electronically by the Competition host. The highest score from that competition will be the winning student and/or student team. In case of a tie, a tie-breaker is in position.
7. 1st place State/Regional Mousetrap Car winners (Middle and High School) and all VEX EDR Robotics teams **DO travel** to the SECME National Student Competition Finals to compete. Competition hosts will REGISTER these student teams (formerly Certification).
8. **SECME Student Team Requirements:** Each SECME student team must be represented by **ONLY THREE (3) TEAM MEMBERS**. If three (3) SECME students are not present to compete, they will be allowed to participate in the National Student Competition Finals but the SECME student team will be **ineligible** to place.

9. The SECME Summer Institute Host University has committed to sponsoring your 1st place SECME winning team comprising of three (3) students per team. All activities and events during the SECME National Student Competition Finals are designed for three (3) students. Bringing a fourth student is strictly prohibited.

10. SECME School Coordinators should identify a chaperone **(one chaperone per team)** to accompany their teams to the National Student Competition Finals. If your team is a mixed-gender team, we encourage that you send two chaperones (one male and one female chaperone). SECME Coordinators will be sent a link to provide chaperone information. This information will be sent to you after your Competition Host has registered your traveling team.
11. **SECME REGISTRATION of State/Regional Competition Winners (formerly certification)**. Invitation to Register opens March 2 and closes April 10. SECME Member Universities (or Sponsors) that host a SECME State/Regional competition must provide the SECME National Office information on their winning SECME student and/or student teams. This REGISTRATION is to be submitted electronically by the SECME Member University or Competition Host or its appropriate designee not later than **Friday, April 10, 2020**. Hard copy REGISTRATIONS and/or emails will not be accepted. During REGISTRATION, competition hosts must also submit PDF documents of the following for each 1st place winning SECME student/student team:
    a. Essays/Vision boards (all divisions)
    b. Water Bottle Rocketry Written and Technical Reports (all Divisions)
    c. Mousetrap Car Written Report and Technical Reports (all Divisions)
    d. Mousetrap Car PowerPoint Presentations (middle/high only)
    e. VEX /IQ EDR Robotics Engineering Notebooks (all divisions)
12. SECME School Coordinators must submit electronically the following documents for their 1st Place winning students/student teams for inclusion on our website and other marketing material. These documents must be submitted not later than April 24, 2020. The upload link will be provided upon notification of the winner/s.
    a. Consent form for the use of photographs or video
    b. Minor and Adult Room Waiver
    c. Photo of the winning SECME student (essay/vision board)
    d. Photo of the winning SECME student team (all divisions, mousetrap car, VEX, water bottle rocketry)
13. SECME School Coordinators must identify the chaperone/s for the traveling student team/s. After your Competition Hosts has REGISTERED your winning team, an invitation to provide your chaperone information will be sent to you. This information must be submitted not later than May 4, 2020.

Recommended Financial Responsibilities for SECME Student Competition Partners

a. SCHOOLS/SCHOOL DISTRICTS are responsible for covering all expenses involved in conducting competitions at the school/school district level.

b. MEMBER UNIVERSITIES are asked to be responsible for:
    - Hosting regional/state competitions (including awards)
    - Travel expenses for 1st place teams to the National Student Competition Finals: round-trip travel, including transportation to/from the airport for up to three student teams (three students per team) and one chaperone per team.

Eligibility Criteria – Page 3 of 3

c. OTHER LOCAL/REGIONAL COMPETITION HOSTS. With today's changing economic climate, participating schools and school districts work to secure funds to cover travel expenses to the SECME National Competition Finals - round-trip travel, including transportation to/from the airport for their student teams (three students per team) and one chaperone per team (see definitions page).
d. SECME NATIONAL COMPETITION FINALS HOST UNIVERSITY. The Dean of the host university's college of engineering supports the expenses for student competition teams and chaperones upon their arrival at the host campus. Meals, lodging and official event activities are included.

Required Reporting Documents Checklist – BY COMPETITION

The following is a listing of required competition reports that should be submitted by the SECME School Coordinator (teacher) to their local/state/regional competition host. The SECME Competition Host, in turn will electronically submit these documents when registering (formerly certification) their 1st place winning SECME students/student teams. Only SECME Students/Student Teams that place 1st at their local/state/regional competition will receive a zero score for that section if reports are not submitted.

COMPETITION EVENT	REQUIRED REPORTING
Mousetrap Car – Elementary School Division ***Non-Traveling Competition Event***	Written Report
Mousetrap Car – Middle/High School Division ***Traveling Competition Event***	• Technical Report • PowerPoint Presentation • Technical Design Drawing. *Not uploaded. Each team must bring their "Drawing" to National Competition Finals*
VEX EDR Robotics – Middle/High School Division ***Traveling Competition Event***	• Engineering Notebook • PowerPoint Presentation • Technical Design Drawing. *Not uploaded. Each team must bring "Drawing" to National Competition Finals*
VEX IQ Robotics– Elementary/Middle School Division ***Non-Traveling Competition Event***	Engineering Notebook
Water Bottle Rocketry – Elementary School Division ***Non-Traveling Competition Event***	Written Report
Water Bottle Rocketry – Middle/High School Division ***Non-Traveling Competition Event***	• Technical Report • PowerPoint Presentation
Essay/Vision Board – Grades Pre-K – 2nd ***Non-Traveling Competition Event***	• Vision Board • 2-4 minute video vision board explanation
Essay/Vision Board – Grades 3 – 12 ***Non-Traveling Competition Event***	• Essay • Vision Board • Vision Board Explanation

Restructure

A number of our participating schools have been involved in SECME for several years; therefore, you are familiar with the flow of our Guidelines. Each year we strongly encourage you to read the SECME Guidelines thoroughly. This year is no exception. We are bringing to your attention an important restructuring. To streamline the SECME National Student Competition Guidelines and reduce duplicity, the flow of the reporting forms has been changed. For competitions that have the same reporting requirements, you will notice there is only ONE set of instructions and ONE reporting form.

Required Reporting Documents Checklist – BY DIVISON

The following is a listing of required competition reports that should be submitted by the SECME School Coordinator (teacher) to their local/state/regional competition host. The SECME Competition Host, in turn will electronically submit these documents when registering (formerly certification) their 1st place winning SECME students/student teams. SECME Students/Student Teams will receive a zero score for that section if reports are not submitted.

ELEMENTARY SCHOOL DIVISION ***Non-Traveling Competition Event***	**REQUIRED REPORTING**
Mousetrap Car AND Water Bottle Rocketry	Written Report
Essay/Vision Board (Pre-K – 2 only)	Vision Board 2-4 minute video vision board explanation
ELEMENTARY/MIDDLE SCHOOL DIVISION ***Non-Traveling Competition Event***	**REQUIRED REPORTING**
Essay/Vision Board	• Essay • Vision Board • Vision Board Explanation
VEX IQ Robotics	Engineering Notebook
Water Bottle Rocketry	• Technical Report • PowerPoint Presentation
HIGH SCHOOL DIVISION ***Non-Traveling Competition Event***	**REQUIRED REPORTING**
Essay/Vision Board	• Essay • Vision Board • Vision Board Explanation
Water Bottle Rocketry	• Technical Report • PowerPoint Presentation
MIDDLE/HIGH SCHOOL DIVISION ***Traveling Competition Event***	**REQUIRED REPORTING**
Mousetrap Car	• Technical Report • PowerPoint Presentation • Technical Design Drawing. *Not uploaded. Each team must bring "Drawing" to National Competition Finals*
VEX EDR Robotics	• Engineering Notebook • PowerPoint Presentation • Technical Design Drawing. *Not uploaded. Each team must bring "Drawing" to National Competition Finals*

Restructure

A number of our participating schools have been involved in SECME for several years; therefore, you are familiar with the flow of our Guidelines. Each year we strongly encourage you to read the SECME Guidelines thoroughly. This year is no exception. We are bringing to your attention an important restructuring. To streamline the SECME National Student Competition Guidelines and reduce duplicity, the flow of the reporting forms has been changed. For competitions that have the same reporting requirements, you will notice there is only ONE set of instructions and ONE reporting form.

Required Documents Checklist – BY SECME COORDINATOR - BYDATE

The following is a listing of competition reports and documents that should be submitted by the SECME School Coordinator (teacher) to the SECME National Office.

DUE APRIL 24, 2020
Reports Written and Technical Reports and Engineering Notebooks. ***These SECME student teams DID NOT place 1st at your local/state/regional competition. (New)***. Submit for: Mousetrap Car, Water Bottle Rocketry and VEX IQ and VEX EDR Robotics (all divisions)
Student Survey All SECME students participating in your SECME program for the 2019-2020 school year regardless of whether they competed in your local/state/regional competition is encouraged to complete the annual student survey. These surveys are to be completed electronically by each student.
Student Survey **All competing SECME students (non-traveling and traveling) that placed 1st at your local/state/ regional SECME competition MUST complete the SECME student survey in order to advance to the SECME National Competition Finals.** If the SECME student survey is NOT completed, the SECME student/student team is NOT eligible to advance to SECME National Competition Finals. If each SECME student on a traveling team DOES NOT complete the survey, that SECME student team WILL NOT be eligible to place at the SECME National Engineering Design Student Competition Finals
• Consent Form to use photograph or video • Team Photo You must submit the above 2 items for all your SECME students/student teams that placed 1st at your local/state/regional competition. Mousetrap Car, Water Bottle Rocketry, VEX IQ/EDR Robotics and Essay/Vision Board
Minority Adult Room Waiver (high school division only) This document is required for all high school division traveling teams - Mousetrap Car and VEX EDR Robotics
DUE BY MAY 4, 2020
SECME School Coordinators must identify and register their traveling team/s chaperone information

Restructure

A number of our participating schools have been involved in SECME for several years; therefore, you are familiar with the flow of our Guidelines. Each year we strongly encourage you to read the SECME Guidelines thoroughly. This year is no exception. We are bringing to your attention an important restructuring. To streamline the SECME National Student Competition Guidelines and reduce duplicity, the flow of the reporting forms has been changed. For competitions that have the same reporting requirements, you will notice there is only ONE set of instructions and ONE reporting form.

***NEW*: How to submit Essay/Vision Boards, Vision Board Video, Written Reports, Technical Reports, PowerPoint Presentations or Engineering Notebooks**

SECME SCHOOL COORDINATORS.

Please follow the dates and methods for submission provided by your SECME local/state/ district or regional competition hosts. If reports, PowerPoints and engineering notebooks are not submitted, please note that only the 1st place winning SECME student teams for mousetrap car (elementary, middle and high school), water bottle rocketry (elementary, middle and high school), VEX IQ Robotics (elementary and middle school), and VEX EDR Robotics (middle and high school) will receive **a zero point for no submission**. Please keep a copy for your records as you will be asked to submit your non-winning teams' reports to the SECME National Office at a later date.

1. The **Filename** for each document submitted should follow this naming convention:

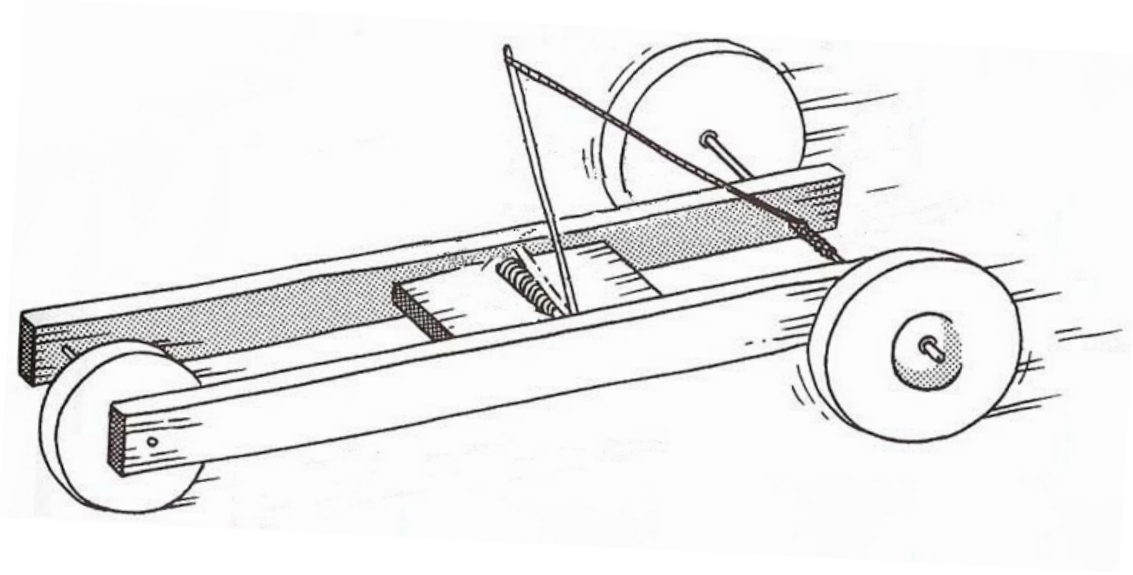
   <Competition Division and Name of Engineering Design Competition>, <Type of Report or Notebook>, <SECME Team Name>, <Official School Name>, <Official School District>.

   Example 1: "hMTC -TR-Eagles-Northside High School-SECME National School District".
   Example 2: "eWBR-WR-Unicorns-STEM Elementary School-SECME National District"
   Example 3: "mVEX-ENG-Rams-Star Academy Middle School-SECME National District"
   Example 4: "eEVB-E-Tom Williams-Treehouse Elementary School-SECME National School District
   Example 5: "mEVB-VB-Sara House-Johnson Elementary School-SECME School District"

   a. To save a MS Word document as a PDF file, click the "File" button, choose "Save As," name the file in the "Filename" field, change the "Save as type" to PDF, then click the "Save" button.
   b. **ADDITIONAL TIPS**:
      a. Keep the report saved in several locations or on multiple computers so that all team members and the school coordinator have access to it at any given time.
      b. Make sure that all copies stay updated with the latest changes and edits.
      c. Plan time to work on the written report from the beginning of the project. **Do not wait until the last minute.**
      d. Because resubmissions are not allowed, before submitting teams should:
         i. Make sure all required sections are included
         ii. Run spell-check/grammar-check
         iii. Carefully re-read the entire completed document
      e. Upon finding mistakes:
         i. make changes/edits
         ii. resave the updated document
         iii. repeat these suggestions until satisfaction is achieved
      f. Electronically submit documents on or before the due date
2. **PreK-2nd grade video submission**. Video files can be in any of the following formats: AVI, WMV, MOB, QT. Videos are to be emailed using the below naming convention:
   a. Example 1: "eEVB-VVB-Sara House-Johnson Elementary School-SECME School District"

3. **COMPETITION HOSTS**. Before March 2nd, you will receive an email from the SECME National Office that will include a link to electronically Register your winning SECME students/student teams **and** submit the required report/s. Registration (formerly Certification) is where you will identify to the SECME National Office, the SECME students/student teams that placed 1st at your local, state, district or regional competition. SECME School Coordinators are to follow YOUR submission dates and must submit the reporting documents to YOU before YOUR competition for all competing SECME students and student teams.
   New. The following documents are to be submitted (by you the SECME competition host) during the Registration period for 1st place winners:
   a. Essays/Vision Boards (all divisions)
   b. Written Reports – Mousetrap Car and Water Bottle Rocketry (elementary school division)
   c. Technical Reports – Mousetrap Car and Water Bottle Rocketry (middle and high school division)
   d. Engineering Notebooks – VEX IQ Robotics (elementary and middle school division) and VEX EDR Robotics (middle and high school division)
   e. PowerPoint Presentations – Mousetrap Car (middle and high school division), VEX EDR Robotics (middle and high school division)

MOUSETRAP CAR (MTC)



Construction and Operation – Mousetrap Car ALL DIVISIONS

Any team not adhering to the construction and operation guidelines will not be eligible to place.

This is a **SECME team competition** with **ONLY three (3) SECME student team members on each SECME student team**.

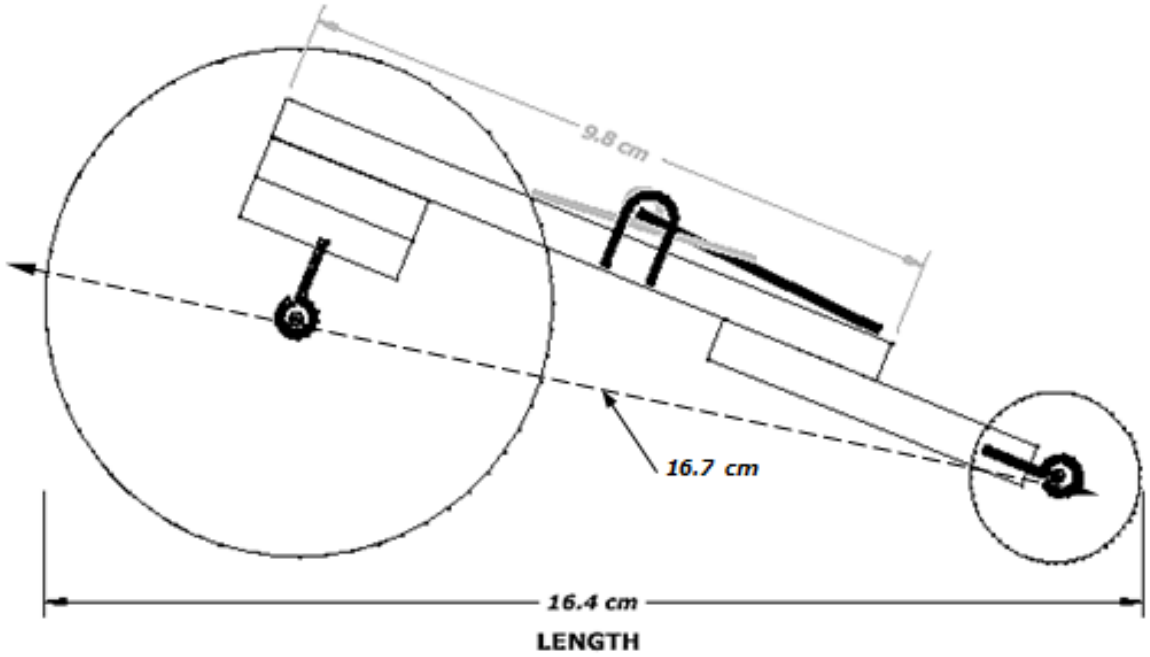
ALL 3 SECME student team members MUST be **PRESENT** to **PLACE** in competition.

CAR CONSTRUCTION AND DESIGN REQUIREMENTS

1. A **standard mousetrap**, dimensions are length of 9.8 cm and width of 4.5 cm and weighing about 25 grams, which **MUST** be used to construct the mousetrap car. NO PHYSICAL, CHEMICAL, MECHANICAL, THERMAL TREATENT OF THE MOUSETRAP IS PERMITTED.
2. Only standard mousetraps with **ONLY ONE SPRING** are **ALLOWED.**
3. Components of the mousetrap are: **wooden base (on which other components are mounted), spring**, **bail**, **locking lever**, and **bait hook** (see component sketch on next page).
4. The mousetrap's "single" spring must be the sole source of power. You may **NOT** use rubber bands, CO_2 boosters, or any other agents or element for extra power, and/or rollback wheels or gears.
5. In the 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 — mechanically, physically, chemically, or thermally. Only the locking lever and bait holder (and the staples that hold them on) may be removed from the base, if desired. The bail may be straightened from its original bent configuration. It must remain as a component of the completed car.
6. The **spring must be visible and/or accessible** to the judges for **inspection**.
7. The mousetrap car must have a minimum of **three wheels** and can be made as long or short as desired as long as **requirement #5** above is met.
8. Mousetrap cars will be tested on a smooth flat surface. Distance will be measured from the front of the front wheel(s) at the starting point to the front of the front wheel(s) at the stopping point of travel, utilizing a straight line to connect the two points (**total displacement and not the path traveled**).
9. There will be two runs for each car and the run with the highest performance score will be used for final scoring of the mousetrap car's performance.
10. The mousetrap car should be a reflection of this year's efforts by your SECME student teams. During competition **ONLY** the SECME students on the same SECME student team can make adjustments (or alterations) to their mousetrap car. If anyone other than SECME student teammates (includes but not limited to SECME Coordinators/Coaches, Parents, etc.) make adjustments to their mousetrap car or there is evidences of this the team doing so will automatically be disqualified and will not be able to place in the competition.
11. **ALL WRITTEN AND TECHNICAL REPORTS SHOULD BE A REFLECTION OF THIS YEAR'S EFFORTS BY YOUR TEAM. EVIDENCE OF PLAGLARISM OR RE-SUBMISSION OF PREVIOUS YEARS' REPORTS WILL RESULT IN ZERO SCORE.**

Measurement of "L," the Mousetrap Car's Longest Dimension

(The length L, is the longest dimension in the x, y, or z-axis. In other words, it could be the length, width, or height of the completed mousetrap car, which is the longest dimension.)



The mousetrap car's **length L is the longest dimension in the x, y, or z-axis** of the car while the car is at a resting state and the spring unwound. In other words, it could be the length, width, or height of the completed mousetrap car, which is the longest dimension. If the bail has been straightened and protrudes past the front or rear of the car, the measurement will be taken from the end of the bail to the other end of the car.

L (for this example) = 16.4 cm

Construction and Design Requirement (MTC) – ALL DIVISIONS

The design requirement of this year's SECME engineering design competition is for the SECME student team to design and build a vehicle solely powered by a single spring mousetrap with maximum budget of $10.00, that can swiftly transport (or carry) a ping-pong ball with a weight of approximately 2.8 grams and diameter of approximately 40 mm (1.57").
The mousetrap car:

- shall carry a ping-pong ball with weight approximately 2.8 grams and diameter of approximately 40 mm (1.57")
- may NOT have glue, tape, or otherwise permanently affix the ping-pong ball to the mousetrap car,
- may NOT wedge the ping-pong ball between the bait hook and the spring,
- shall be designed to allow for the purposeful removal of the ping-pong ball with minimal effort so that it can be examined by the judges.
- shall transport the ping-pong ball (without losing it for the entire run).

The materials used to construct the mousetrap car must have a maximum budget of no more than $10.00.

Original receipts for all materials purchased must be included* (scanned) AND recorded on the SECME Mousetrap Car Material List. * (*If receipts are unavailable for new (not recycled) items, a link to the website where purchased may be provided to confirm the item cost.)*

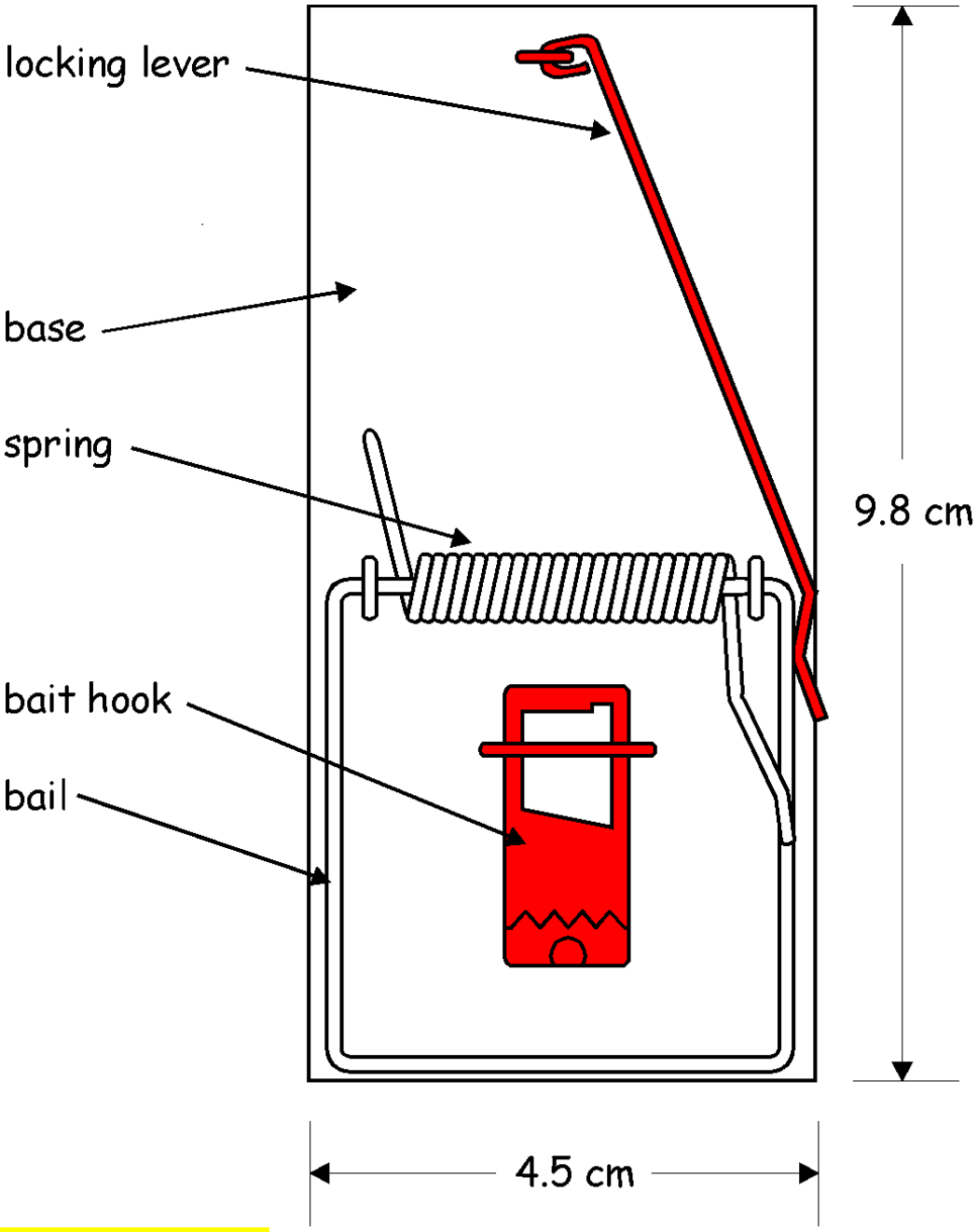
- Do NOT include the cost of the basic mousetrap in your materials list
- If using recycled materials, documentation must show how these items were obtained.
- Recycled materials are not included in the $10.00 maximum budget

The ping-pong ball must remain in the mousetrap vehicle for the entire run of the mousetrap car in order to receive a qualifying score. If the ping-pong ball falls off during the run, that run is disqualified. In the instance that a the ping-pong ball is dislodged as a result of a collision with an obstacle, the run is not disqualified, as long as the distance is measured only to the point of collision (which will be measured from the front of the front wheel(s) at the starting point to the front of the front wheel(s) at the stopping point or the point of collision).

A standard the ping-pong ball with diameter 40 mm (1.57") and 2.8 g will be given to the SECME student team(s) on the day competition before their run at SECME National Student Competition.

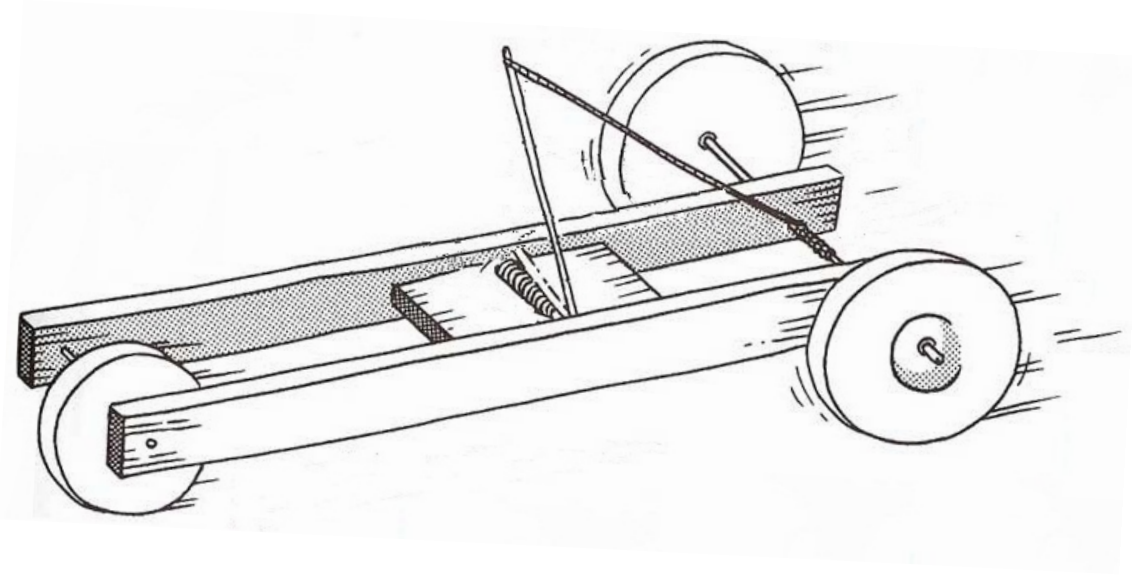
*NEW – The Mousetrap Car Materials List must be included in the Appendix of the Technical Report for middle and high school teams; and as part of the written report for elementary school teams. If the Materials List is NOT submitted, the Cost (**C**) for the team's score will be calculated as double the highest cost ($\mathbf{C_H}$) in the competition formula.

Standard Mousetrap Diagram



NOTE: Red parts may be removed.

ELEMENTARY SCHOOL DIVISION (MTC)



The MTC Engineering Design Student Competition, Elementary School Division **requires participation in these two areas**:

1. Performance Run of the Mousetrap Car
2. Written Report on Mousetrap Car

Calculation of Mousetrap Car Score-Elementary School Division

The performance score for the Mousetrap car run is calculated using the following equation:

$$P = \frac{D}{L} \times \frac{D}{T} \times \frac{C_H}{C}$$

where:

D is distance the mousetrap car travels {measured in centimeters (cm)}.
L is the longest length of the completed mousetrap car from any orientation on the x, y, z axis {measured in centimeters (cm)}.
T is time measured from the time the mousetrap car is released until the car has stopped {measured in seconds-(s)}.
C^+ is the cost of the construction of the completed mousetrap car (based on the team's MTC Materials List)*
C_H is a constant 10 (the highest possible cost) **Therefore, $\boldsymbol{C_H = \$10.00}$** in the equation.
P is the mousetrap car performance run score.

$^+$If the value of C is \$0.00 (meaning that except for the mousetrap, your car is built entirely with recycled materials), then use \$0.01 (one penny) for the value of C. **Therefore, $\boldsymbol{C = 0.01}$** in the equation.

Example of C is \$0.00 (meaning that except for the mousetrap, your car is built entirely with recycled materials)

$C_H = \$10.00$ $D = 950\ cm$ $T = 9.57\ s$

$C = \$0.01$ $L = 30\ cm$

$$P = \frac{D}{L} \times \frac{D}{T} \times \frac{C_H}{C} = \frac{950}{30} \times \frac{950}{9.57} \times \frac{10}{0.01} = 3{,}143{,}881$$

If the MTC Materials List is NOT submitted, the **Cost (C) for the team's score will be calculated as double the **highest cost (C_H)** in the competition formula.*

Calculation of Mousetrap Car Score-<u>Elementary School Division</u> – con't

$$F = \frac{P}{P_H} \times 100\ \%$$

where:

P_H is the highest performance mousetrap car score on the day of competition.
F is the final performance score (to be combined with score from the Written Report).

Distance will be measured from the front of the front wheel(s) at the starting point to the front of the front wheel(s) at the stopping point of travel, utilizing a straight line to connect the two points.

The Mousetrap Car **<u>MUST</u>** travel **<u>MINIMUM</u>** distance of **<u>2 meters</u>** to qualify to place in competition.

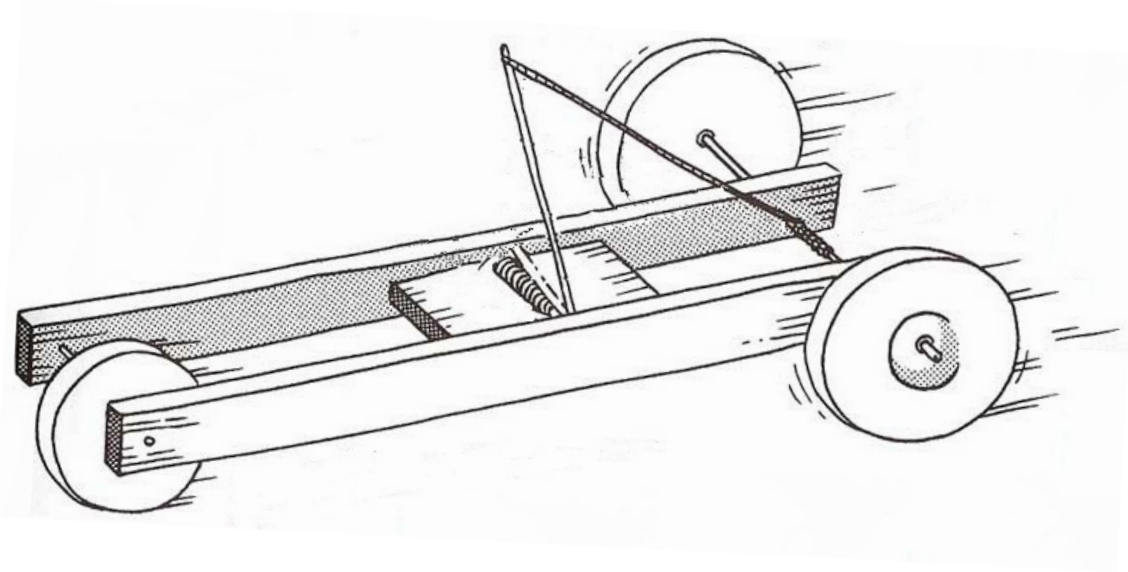
If the mousetrap car stops due to hitting an object or wall, the distance will be measured from the starting point to the point of impact.

Final Score is based upon on the following 2 criteria:

- Performance Score – 65%
- Written Report – 35%

NOTE: The maximum elementary division mousetrap car final score is **<u>100 pts</u>**.

MIDDLE AND HIGH SCHOOL DIVISION (MTC)



The MTC Engineering Design Competition, Middle and High School division **requires participation in these five areas**:

1. Mousetrap Car Performance Run
2. Technical Report of Mousetrap Car
3. Technical Design Drawing of Mousetrap Car
4. PowerPoint Presentation on the Mousetrap Car
5. The Art of Engineering

Overall Team Score is based upon on the following 5 criteria (based on 100 pts):

- Performance Score-30%
- Technical Report-20%
- Technical Drawing-20%
- PowerPoint Presentation-15%
- The Art of Engineering*-15%

The mousetrap car **MUST** travel **MINIMUM** distance of **5 m** to qualify to place in competition for middle school division.

The mousetrap car **MUST** travel **MINIMUM** distance of **10 m** to qualify to place in competition for high school division.

NOTE: The maximum middle and high school division mousetrap car final score is **100 pts**.

*** The Art of Engineering will be held during National Student Competition Finals Only**

Calculation of Mousetrap Car Score - Middle & High School Division

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

$$P = \left(\frac{w}{W}\right) \times \left(\frac{D}{L}\right) \times \left(\frac{C_H}{C}\right) \times \left(\frac{D}{T}\right)$$

where

w is the combined mass of a ping-pong ball and standard mousetrap measured in grams (g).
The minimum required mass of the ping-pong is 2.8 g and the average mass of a standard mousetrap is 25 g.
Therefore $\boldsymbol{w = 27.8\ g}$.
W is the total weight of the completed mousetrap car (g).
D is distance the mousetrap car travels measured in centimeters (cm)
L is the longest length of the completed mousetrap car from any orientation on the x, y, z axis measured in centimeters (cm). In other words, it could be the length, width, or height of the completed mousetrap car, which is the longest dimension.
C^+ is the cost of the construction of the completed mousetrap car (based on the team's MTC Materials List)*
C_H is a constant 10 (the highest possible cost) **Therefore, $\boldsymbol{C_H = \$10.00}$** in the equation.
T is time measured from the time the mousetrap car is released until the car has stopped seconds (s).
P is the mousetrap car performance run score.

[+]If the value of C is $0.00 (meaning that except for the mousetrap, your car is built entirely with recycled materials), then use $0.01 (one penny) for the value of C. **Therefore, $\boldsymbol{C = 0.01}$** in the equation.

Example of C is $0.00 (meaning that except for the mousetrap, your car is built entirely with recycled materials)

$C_H = \$10.00$ $W = 30.8\ g$ $T = 9.57\ s$
$C = \$0.01$ $D = 950\ cm$
$w = 27.8\ g$ $L = 30\ cm$

$$P = \left(\frac{w}{W}\right) \times \left(\frac{D}{L}\right) \times \left(\frac{C_H}{C}\right) \times \left(\frac{D}{T}\right) = \frac{27.8}{30.8} \times \frac{950}{30} \times \frac{950}{9.57} \times \frac{10}{0.01} = 2{,}838{,}924$$

If the MTC Materials List is NOT submitted, the **Cost (C) for the team's score will be calculated as double the **highest cost (C_H)** in the competition formula.*

Calculation of Mousetrap Car Score - Middle & High School Division – con't

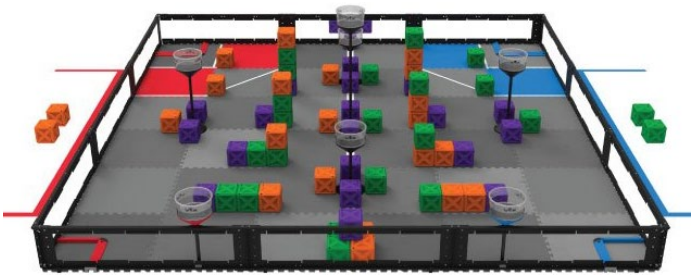
$$F = \frac{P}{P_H} \times 100\%$$

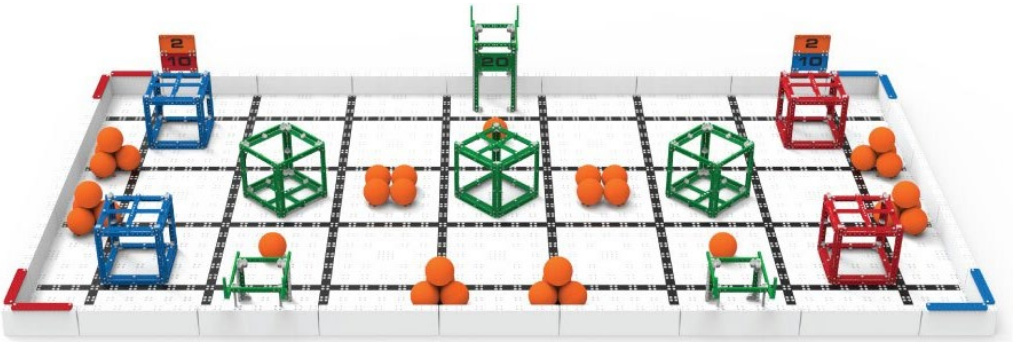
P_H is the highest performance score on the competition.
F is the final performance score.

The mousetrap car travel distance will be measured from the front of the front wheel(s) at the starting point to the front of the front wheel(s) at the stopping point of travel, utilizing a straight line to connect the two points. If the mousetrap car stops due to hitting an object or wall, the distance will be measured from the starting point to the point of impact.

The mousetrap car **MUST** travel **MINIMUM** distance of **5 meters** to qualify to place in competition for middle school division, and of **10 meters** to qualify to place in competition for high school division.

VEX EDR AND VEX IQ ROBOTICS





The VEX EDR and VEX IQ Robotics Design System offers students an exciting platform for learning about areas rich with career opportunities spanning science, technology, engineering and math (STEM). These are just a few of the many fields' students can explore by creating with VEX EDR or VEX IQ Robotics technology. Beyond science and engineering principles, a VEX EDR or VEX IQ Robotics project encourages teamwork, leadership and problem solving among groups. It also allows educators to easily customize projects to meet the level of students' abilities.

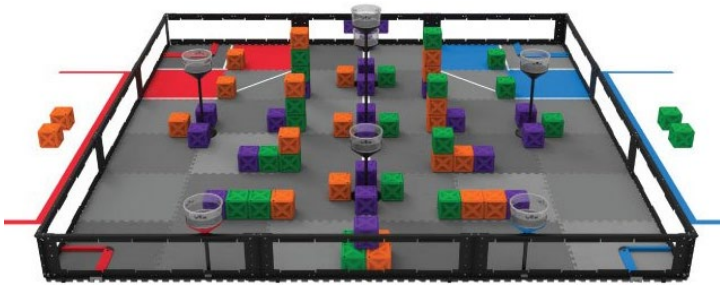
Please follow the instructions below to participate in the SECME/VEX EDR or VEX IQ Robotic Competition.

1. **Team Registration** - You are encouraged to register your team with VEX EDR or VEX IQ Robotics at www.RobotEvents.com. Registration also gets you plugged into the system and access to resources.
    a. Registration costs $100 for the first team and $50 for each additional team at the same school.
    b. Registration gets you access to the official VEX EDR or VEX IQ Robotics Competitions and a welcome kit that includes:
        i. Sample Game Pieces
        ii. Robot License Tags
        iii. Robot Flags
        iv. Other promotional items
    c. Teams **DO NOT** have to be registered to participate in **"SECME ONLY"** events.

2. **Competition Format:** SECME will follow the VEX EDR Robotics Tower Takeout "Game Rules" and may or may not include the following:
    a. Alliances
    b. Head-to-head
    c. Autonomous Period
    d. Robot Skills Challenge
    e. Programming Challenge

SECME Student Team Requirements: Each SECME VEX EDR Robotics student team must be represented by **ONLY THREE (3) SECME STUDENT** team members.

MIDDLE/HIGH SCHOOL (VEX EDR)



Tower Takeout

New Game ….

www.VEX Robotics.com

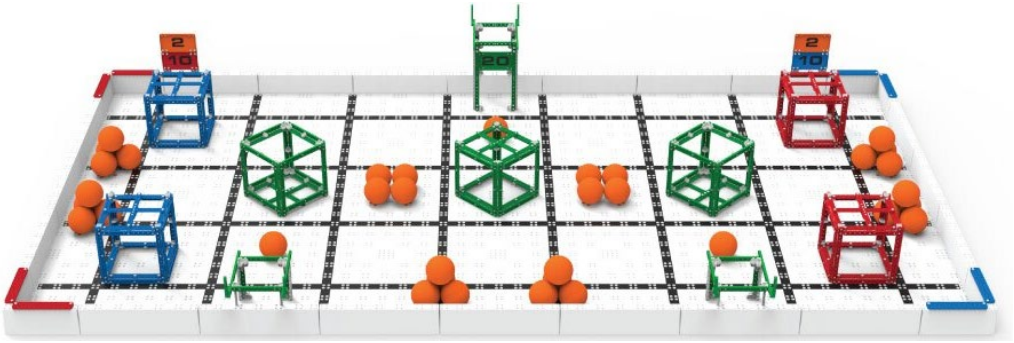
https://www.VEX Robotics.com/VEX Roboticsedr/competition/vrc-current-game

1. **Robot Hardware** - If you already have a robot kit - reuse it, you do not need to spend money buying another one! If you need VEX EDR Robotics parts, we recommend getting a quote from your local reseller - costs you nothing extra but gets you their local support. Please visit http://www.VEX Robotics.com/find-a-reseller/ to find a reseller in your area or visit the VEX EDR Robotics website at www.VEX Robotics.com. You can also contact the SECME National office to direct you to the support representative for your state.

2. **2019-20 Game:** This year's game is Tower Takeout. Students, with guidance from their teachers and mentors will aim to build the most innovative robots possible and work together to obtain the most pts possible. In addition to just having a great time and building amazing robots, through their participation in the VEX EDR Robotics Competition and their work within their team, students will learn many academic and life skills. For access to the official VEX EDR Robotics Tower Takeout Competition Resources CLICK HERE.
   CLICK HERE to see the VEX EDR Robotics Tower Takeout video.

3. **Member Universities & Competition Host Sponsors:** VEX EDR Robotics Competition is held at the SECME National Student Competition Finals. We encourage incorporating VEX EDR Robotics as part of your Regional/State Student Competition. If VEX Robotics is **not** part of your SECME State or Regional Competition (therefore you have no 1st place winner) but you have individual SECME participating schools that include VEX EDR Robotics as part of their SECME activities, these schools may register to participate and compete at SECME National Student Competition Finals.
4. **ONLY TWO (2) SECME TEAMS** from **EACH SCHOOL** in a **DISTRICT** will be allowed to compete in the 2019-20 SECME National Student Competition.

ELEMENTARY SCHOOL (VEX IQ)



SQUARED AWAY

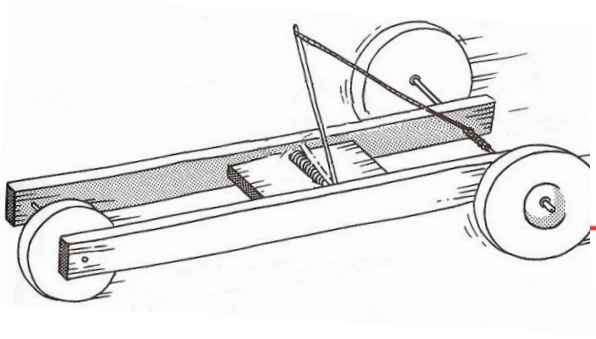
https://www.vexrobotics.com/vexiq/
https://www.vexrobotics.com/vexiq/competition/viqc-current-game

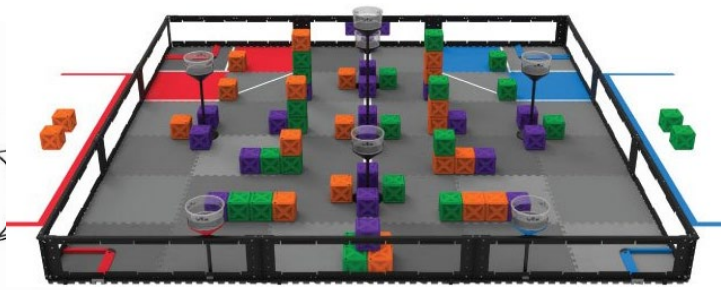
1. **Robot Hardware** - If you already have a robot kit - reuse it, you do not need to spend money buying another one! If you need VEX IQ Robotics parts, we recommend getting a quote from your local reseller - costs you nothing extra but gets you their local support. Please visit http://www.VEX Robotics.com/find-a-reseller/ to find a reseller in your area or visit the VEX IQ Robotics website at www.VEX Robotics.com. You can also contact the SECME National office to direct you to the support representative for your state.

2. **2019-20 Game:** This year's game is Squared Away. Students, with guidance from their teachers and mentors will aim to build the most innovative robots possible and work together to obtain the most pts possible. In addition to just having a great time and building amazing robots, through their participation in the VEX IQ Robotics Competition and their work within their team, students will learn many academic and life skills. For access to the official VEX IQ Robotics Squared Away competition resources click here. Click here to see the VEX IQ Robotics Squared Away video.

3. VEX IQ Robotics is a SECME **non-traveling** student team competition.

THE ART OF ENGINEERING (AOE)





The Art of Engineering Showcase

What is the Art of Engineering (AOE)? This is an opportunity for SECME student teams to showcase and discuss the design approach used for their car/robot. During the AOE, using the "secret shopper" method, unidentified judges will evaluate SECME student teams and document their experience and interactions.

- This competition component showcases the **ART** in SECME student team engineering design of their car/robot.
- The SECME student team will display their car/robot and technical drawing.
- Each SECME student team will give a 3 to 5-minute pitch to the unidentified judges on their car/robot from the creative, innovative and artistic perspective. In order words, sell your car/robots' capabilities in a creative and informative way. Every SECME student team member must contribute for the team to get all possible points.
- Additionally, each SECME student team will be given the opportunity to evaluate their peers' engineering design of their car/robot

Dress Code. Required for the Art of Engineering: polo shirt (school color) and khaki pants.

WATER BOTTLE ROCKETRY

WATER BOTTLE ROCKETRY DESIGN COMPETITION

While promoting Space Propulsion Awareness, the Water Bottle Rocket Competition serves to familiarize students with the basic principles of rocketry, design engineering, and manufacturing engineering. SECME Students will **design and manufacture** a water bottle rocket using a 2-Liter bottle as the pressure vessel. The rocket must be capable of launching from the SECME Water Bottle Rocket Launcher given specific launch criteria. Additionally, each SECME team will **develop a patch design**, **written or technical report**, and **technical drawing**. The SECME team's complete success will not solely be judged on rocket performance, but the combined effort of the SECME student team.

THE MISSION

The mission is to design a Water Bottle Rocket Vehicle capable of staying aloft for the longest amount of time (measured in seconds).

MISSION SUCCESS and Safe Flying!!
***** Remember you will never be a winner unless you try and if you try your best, you have already made it to the bull's-eye :-) *****

Construction and Operation (WBR)- ALL DIVISIONS

1. The pressure vessel must be **ONE clear 2 liter bottle** (i.e. **NO tinted bottles allowed** for use as pressure vessel), see Diagram 1.

2. Water and air pressure will be the sole source of propellant.

3. **Do not use the following materials to construct you rocket…!!!**
    a. **Metal**
    b. **Glass**
    c. **Hard plastics**
    d. **Spikes**
    e. **Antennas of any kind**
    f. **Rocks**

These materials are dangerous and could cause harm to the operator and those present in the presence of the water bottle rocket launch.
NOTE: * * * USE OF THESE MATERIALS WILL AUTOMATICALLY DISQUALIFY THE SECME TEAM FROM THE COMPETITION * * *.

4. On the bottom of the rocket, leave **7.5 cm** from the throat of the exit plane clear of any coverings (paint, markings, drawings, etc.), see Diagram 1.

5. Maximum total height of rocket is **76 cm**, see Diagram 1.

6. Nose-cone tip must have a minimum radius of **1.5 cm**, see Diagram 2.

7. Fins may extend to throat exit plane, see Diagram 2.

NOTE: No forward swept types of fins are allowed to be used on the rocket.

8. The maximum fin width distance from the bottle is **10 cm** (or **16.5 cm** from center of bottle axis). See Diagram 3.

9. The use of parachutes is **NOT** allowed.

Water Bottle Rocket Identification Diagrams

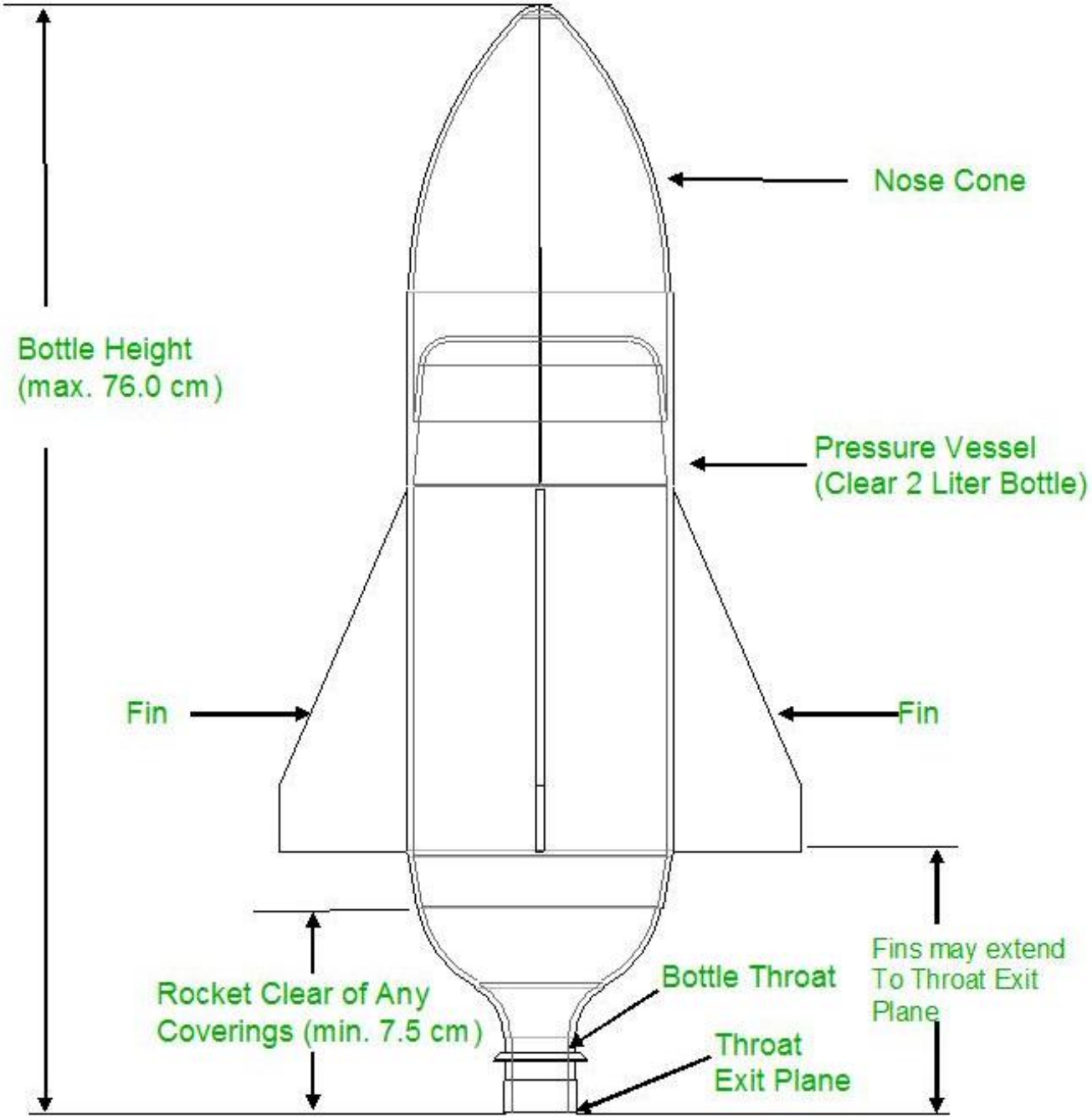


Diagram 1

Water Bottle Rocket Nose Cone Diagram

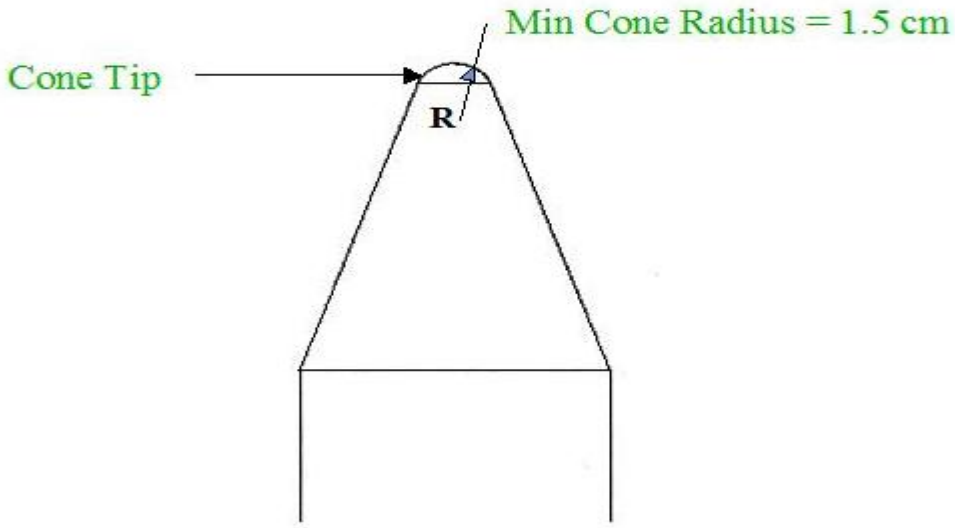
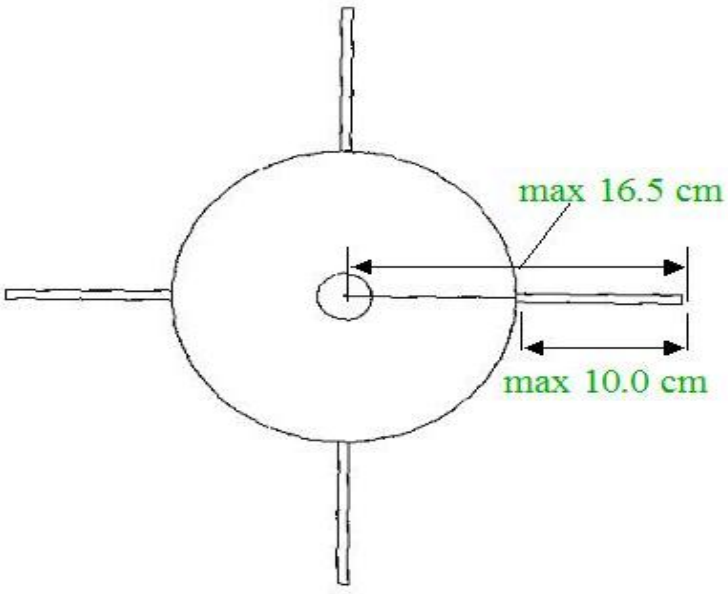


Diagram 2

Water Bottle Rocket Fin Diagram



Patch Design Challenge (WBR) – All Divisions

WHAT IS A PATCH? A patch is a creative display that reflects the dedication and mission of the SECME student team. This symbolic picture must comply with the following patch design challenge:

1. Each SECME student team is required to submit a completed patch design
    a. (check with your SECME Regional/State Host for local submission deadlines)
2. On the day of competition, but before launch, an actual operating rocket with its corresponding patch design must be submitted in order to compete in the competition.
3. Each entry is to be prepared and submitted by the SECME student team members that will be participating in the Water Bottle Rocket Design Student Competition.
4. Patch designs must be submitted on 13" × 13" poster board.
5. All patch entries must follow the SECME competition theme: **SECME: STEM CHAMPIONS**
6. A short (less than 1-page) explanation of the symbols of the patch must be included on the back of the patch design (**Refer to example on next page).** The following information should be included on the back with the written explanation of the patch design:
    a. Competition (ex. SECME Water Bottle Rocket)
    b. Division (ex. Elementary School Division)
    c. SECME Team name
    d. Official School Name
    e. Official School District Name
    f. SECME Student Team Members' Names and Grade Levels
    g. SECME School Coordinator's/Teacher's Name
    h. Date of SECME Competition
7. All SECME student teams participating in the SECME Water Bottle Rocket Student Competition must display their patch before the launch of their rocket.
8. Patch Design must be the original work of the SECME student team. It must be hand-made (not computer generated) and age-appropriate.
9. Only ink pens, pencils, color pencils, crayons, markers, or paint may be used.

NOTE: Any patch design deemed inappropriate will be removed from the competition and the SECME team will receive zero patch design points.

THE PATCH DESIGN WILL BE JUDGED ON THE FOLLOWING CRITERIA:

1. Paper Size Requirement (13x13 poster board)
2. SECME Theme-SECME: STEM Champions
3. Appearance
4. Creativity
5. Explanation of Patch

WATER BOTTLE ROCKETY PATCH DESIGN EXAMPLE

Example Explanation of Patch

The propelled rocket represents the school system, supported by the educators and students, following a path towards excellence. The radiant five 8-point stars symbolize the enrichment of Science, Engineering, Communication, and Mathematics, whereas, the seven 4-point stars represent for the seven Universities that founded SECME. The three distinct contrails STEMing behind the rocket, symbolize the support offered through SECME, Universities, and Industry partners. The ring before the rocket depicts the student's path through the SECME program, returning full circle to support the efforts of the program. As we have entered the new millennium, the sun over the horizon symbolizes of the induction of the new Water bottle rocket Design Competition into the SECME Programs. Accuracy, the focus of the contest, is represented by the target created by the outer ring, deep space, and the earth. The border is supported on the left and right by symbols, respectively, for water and compressed air, which are the fluids used to propel the rockets.

Water Bottle Rocketry-Elementary School Division

Calculation of Water Bottle Score (WBR) – Elementary School Division

NOTE: 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, before the beginning of the water bottle rocket launching competition.

1. An overall winner will be judged upon the following criteria (based on 100 pts):
   - Hang Time of Rocket 60 %
   - Patch Design 25 %
   - Written Report 15 %

Final Hang time Score Calculation

$$Final\ Hangtime\ Score = \left(\frac{team\ hangtime}{max\ hangtime}\right) \times 100\%$$

Hang time… is defined as the time from when the rocket leaves the launch pad until the time it (or any part of it) reaches the ground or strikes an object.
This measurement will be taken using a stopwatch by two or three (2-3) qualified judges; the average of the judges times will be used as the final "hang time".

Max hang time… maximum hang time recorded during the competition

The objective of the contest is for each SECME student team to launch a rocket propelled by water and air and for it to stay aloft for the maximum amount of time (measured in seconds). The launch angle, which can be adjusted from approximately **90 degrees (90°),** will be kept the **SAME** for all rockets launching during a particular competition. Each rocket will be launched using **12 oz** of water and at **70 psi** of air pressure.

NOTE: The maximum final elementary Water Bottle Rocketry score must range from **0 - 100 pts**.

Water Bottle Rocketry – Middle/High School Division

Calculation of Water Bottle Rocket Score (WBR) - Middle and High School Division

NOTE: 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, before the beginning of the water bottle rocket launching competition.

1. Each SECME student team is required to submit a completed entry form, technical paper, and patch design
   a. (check with your Regional/State Host for local submission deadlines)
2. On the day of competition, but before launch, an actual operating rocket with its corresponding technical drawing must be submitted in order to compete in the competition.

3. An overall winner will be judged upon the following criteria (based on 100 pts):
   - Hang Time of Rocket 55 %
   - Patch Design 10 %
   - Technical Report 20 %
   - Technical Drawing 10 %
   - PowerPoint Presentation 5 %
4. Final Hang time Score Calculation

$$Final\ Hang\ Time\ of\ Rocket\ Score = \left(\frac{team\ hangtime}{max\ hangtime}\right) \times 100\%$$

Hang time… is defined as the time from when the rocket leaves the launch pad until the time it (or any part of it) reaches the ground or strikes an object.
This measurement will be taken using a stopwatch by two or three (2-3) qualified judges; the average of the judges times will be used as the final "hang time".

Max hang time… maximum hang time recorded during the competition

The objective of the contest is for each team to launch a rocket propelled by water and air and for it to stay aloft for the maximum amount of time (measured in seconds). The launch angle, which can be adjusted from approximately **90 degrees (90°),** will be kept the **SAME** for all rockets launching during a particular competition. Each rocket will be launched using **12 oz** of water and at **70 psi** of air pressure.

NOTE: The maximum final middle/high school division water bottle rocketry score must range from **0 - 100 pts**.

Essay/Vision Board Competition Guidelines

Elementary, Middle, and High School Divisions

Essay/Vision Board Competition Guidelines

INTRODUCTION:

What is an Essay/Vision Board? SECME's essay/vision board is a written and illustrative representation of your goals in STEM. This year's SECME National Student Competition theme is:

"***SECME: STEM CHAMPIONS"***

COMPETITION REQUIREMENT:

To express your career aspirations both written and visually as follows: How has participation in SECME "**made you a STEM champion**?" What SECME activities that involve **S**cience, **T**echnology, **E**ngineering, **A**rt or **M**athematics do you find fun? Why are they fun? What kinds of careers use **S**cience, **T**echnology, **E**ngineering, **A**rt and **M**athematics? What level of education do you need to pursue these careers? This SECME competition will give you the opportunity to express your explorations.

Grades PreK-2. Create a vision board on paper (electronically or by hand) of your SECME experience and goals. Next, working with your SECME Coordinator you will create a 2-4 minute video explaining what your vision board represents. Grades PreK-2, **complete Phase 5 only**. The essay/vision board must include the following:

a. Required cover page
b. 2-4 minute video explaining your vision board
c. Vision Board drawing is 1 page in length and can be positioned either portrait or landscape
d. Total pages - 2. Cover page and the vision board

Grades 3-12. Express your SECME experience in writing and visually depict your explorations by creating a vision board on paper. Grades 3-12 must complete all five phases. The essay/vision board must include the following:

a. Required cover page
a. Essay is 2 - 3 pages in length
b. Write a one paragraph description of your vision board (on a separate page-not on the vision board page)
c. Vision Board drawing is 1 page in length and can be positioned either portrait or landscape
d. Maximum pages of essay and vision board, including cover page is 6

COMPETITION TASK:

All explorations require going to where you have never gone before. In preparing for this year's competition you will embark on a personal exploration and use your SECME experiences to guide as you carefully research, plan, and deliver a well-written essay along with artwork that reflects you have searched and discovered your own answers as to what brings the champion out of you in the areas of **S**cience, **T**echnology, **E**ngineering, **A**rt and **M**athematics. Be prepared to have *fortitude* while you gather your information, *resolve* as you structure your essay, and *diligence* as you make your essay and vision board the best it can be.

PROCESS:
Be prepared to use technology to travel to places around the world and beyond.
Be prepared to broaden your world of possibilities.
Be prepared to think about your future in different ways.
Be prepared to explain in writing and artistic format how your personal experience in SECME and your journey of exploration has ***brought out the champion***.

Your exploration will be divided into five phases.
Phase 1: Interest Inventory
Phase 2: Career Search
Phase 3: Education Search
Phase 4: Essay
Phase 5: Vision Board

Follow *all* instructions. Each essay and vision board entry are to be prepared and submitted by an individual student. The project has six phases one project. The vision board may be depicted by hand or computer. You may use clip art or electronic visual graphics. You may also use traditional magazine clippings, newspaper clippings, crayons, markers, color pencils, color pen, and/or paint. Your vision board must be one page, and it can either be positioned in portrait or landscape. The written essay, vision board and cover page cannot exceed six pages.
WHAT DO YOU NEED? A willingness to discover, access to the Internet, a *Journal* to write down all the information you find, and your imagination! Are you ready?

Phase 1: Interest Inventory
It's all about YOU!
(and Science, Technology, Engineering, Art and Mathematics)

What **STEM**ulates your imagination? What SECME experiences are fun? Do you enjoy working with a team in SECME to build mousetrap cars, Balsawood bridges, and water bottle rockets in SECME? Do you enjoy creating the technical drawing that shows the design of your mousetrap car or water bottle rocket that was used in SECME competition? What other activities do you work on in your SECME club? Do you like coding? Do you like solar energy? Do you like the challenge of figuring out ways to build a "better" car or bridge or water bottle rocket in SECME? Do you like to do research on interesting **S**cience, **T**echnology, **E**ngineering, **A**rt and **M**athematics topics in your SECME club? Do you like to plan big projects in your SECME club or class?

Ask yourself: Do I wake up thinking about *"what"* in STEM every day (you fill in the blank) and do I go to sleep thinking about *"what"* in STEM (you fill in the blank), and never get bored with it"? Whatever your answer, that is your "passion" and that passion will help drive you to become successful in what it is you want to become. Ask yourself: How has participation in SECME brought out my inner **STEM champion**? How has participation in SECME helped me to grasp the challenging concepts of STEM?

1. Get out your *Journal* and answer these questions for yourself. Take some time! Don't worry about going fast. Really search your memories and write down your thoughts…

2. Now, talk to your friends, your teachers, your relatives – ask them what they think **YOU** enjoy and write down their answers in your Journal (you might be surprised by what they say!).

3. Have they observed how your SECME experience has helped you?

4. Then do some Internet research. Below are some interesting links, but you are not limited to just these! Ask your teacher for help finding other sites to visit. Don't have the Internet at home? No problem! Go to your local public library – and be sure to tell the librarian that you are doing research and ask for help!

Take your time and have fun! Don't forget to use your *Journal* to write down information – use as many pages as you want. You never know what you might need for the next phases of your exploration. Explore these additional websites to help you get started.

http://www.discovere.org/discover-engineering
http://www.greatachievements.org/
http://stemcareer.com/
http://www.onetonline.org/find/stem?t=0
http://www.wisegeek.com/science.htm

Phase 2: Career Search
It's all about YOU!
(and Science, Technology, Engineering, Art and Mathematics)

On this next leg of your exploration, it's time to find out what career just might be **STEM**ulating for you! Let yourself be surprised by what you might find that you never even knew was a "job." The links below are just a beginning. Ask for help to find other good Internet sites. And don't forget to use your *Journal* to log all the places you go! You never know when you might want to check your *Journal* as you move through the next phases of your personal journey.

1. First visit the SECME Website (www.secme.org). On the green menu bar across the top, hover your mouse over "More" and click on "Government & Industry Partners." When you click on this link, you will see the seven (7) corporations that are major SECME sponsors. Click on each one to visit their Websites – have fun looking at all the cool things they do!

2. Plan to take a few days for this next step in your exploration: Go back to the green menu bar at the top of the website and hover your mouse over "More." This time, click on "Other Alliance Partnerships." There are many industries and government agencies that help to support your SECME program in many different ways. Find one that is familiar, click on its link, and explore its website. Then find one that you have never heard of before and explore it, too. Take a few days to explore all the links…you will be **STEM**ulated by all the opportunities and information out there just waiting to be discovered!

3. Now that you have new information about many different industries and government agencies that are **STEM**ulating, visit some websites that tell you about different careers in and **S**cience, **T**echnology, **E**ngineering, **A**rt and **M**athematics. There are several listed below you can go to, but don't stop there! Get some help to find other information. And, of course, don't forget to use your *Journal* to keep a record of all the interesting information you discover!

http://www.aboriginalaccess.ca/adults/types-of-engineering
http://www.egfi-k12.org/
http://www.egfi-k12.org/#/cards/mechanical
http://www.egfi-k12.org/#/cards/computer
http://teachers.egfi-k12.org/resource-engineering-scholarships/ http://www.stem-works.com/
http://www.coolmath.com/careers.htm
http://www.ams.org/ams/what-mathdegree.pdf
http://www.maa.org/careers/
http://www.pbs.org/safarchive/5_cool/53_career.html
http://library.thinkquest.org/J0113274/index.htm

Phase 3: Education Research and Fun Facts about SECME and its University Partners
It's all about YOU!
(and Science, Technology, Engineering, Art and Mathematics)

Your *Journal* should be pretty full of information now…
Look back at your notes from Phase 1 and Phase 2 of your exploration. Do you have some ideas about what you like to do and about some careers that just might be fun for you to pursue? SO, NOW WHAT? Time to explore how to get prepared for a **STEM**ulating career! HOW? You need to think about what kind of education you are going to need. In this phase of your journey, you are going to visit universities across the country… prepare to be surprised about how different they are! Take careful notes in your Journal.

It's back to the SECME Website (www.secme.org) homepage's link. Hover your mouse over "More" and select "Member Universities." If you click on the "Founding Universities" button in the upper right corner, you find the names of the six Deans and their universities that first met in **1975** to create SECME to encourage students like you to go to college and get degrees that would lead to **STEM**ulating careers. That was **44 years ago**! Can you imagine how many SECME students have been **STEM**ulated over the past 44 years because these Founders of SECME wanted kids to explore **STEM**ulating lives?

a. Now go back one page to see the "SECME University Council Member Institutions." You will find a listing of **universities** that have engineering programs that support SECME! These university engineering programs are just waiting for you to get to know them!
b. Get a map of the United States. Take time and click on the different university links. Find their locations on the map. What university is closest to you? What university is the farthest away?
c. Most of the university engineering programs have interesting information and really fun summer programs. Explore the sites and see what you can find!
d. What university engineering schools looks like a place you could see yourself in the future?

There are tons of information at your fingertips – Enjoy! Don't forget to take good notes! You're almost ready to start your essay!

Phase 4: Essay
It's all about YOU!
(and Science, Technology, Engineering, Art and Mathematics)

You've done a lot of work. Time to put it all together and use your new knowledge to persuade the SECME Essay Competition Judges that you have figured out your destination!

In Phase 4, you will need to be diligent. You've gathered a good bit of research, and now you need to decide how you can use it. The competition judges want you to help them understand:

- What **STEM**ulates your mind in **S**cience, **T**echnology, **E**ngineering, **A**rt and **M**athematics?
- What your research has shown you? Is it possible you have found the career you want to pursue?
- What your research has shown you? Is it possible you have found the university or college you will attend?

Don't make the mistake of thinking that this phase of your journey will be easy. You will want to take your time and write several drafts before you submit your essay to the judges.

It's ok to ask for help after you write your drafts. However, YOU need to make sure that your essay is in YOUR words! The judges want to feel like YOU are talking to them, not a parent or a teacher or a friend…YOU! Others can make sure that your final copy is corrected so that it doesn't have errors, but they should NOT express your feelings for you – they are YOUR ideas and reactions to what you have discovered during your exploration. And don't forget to let the judges know if you were surprised by any information you found in your research – they will be interested to learn that your journey was a success. *A successful personal exploration will be one in which you learned something about yourself – about what gets you excited and ready to go for your goals.* You should NOT have known all of that before you started!!

So, it's time to think, write, re-write, edit, and then move on to Phase 5!

Phase 5: Vision Board
It's all about YOU!
(and Science, Technology, Engineering, Art and Mathematics)

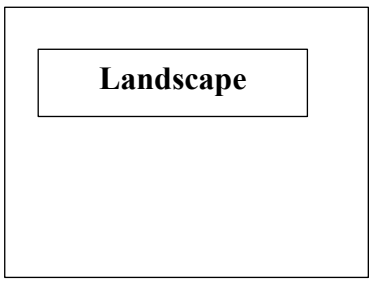
This vision board is a visualization of your career goals. Now that you have **tapped into your inner champion**, using art, create a vision board that depicts your future career path and expresses your hopes and dreams in **S**cience, **T**echnology, **E**ngineering, **A**rt and **M**athematics.

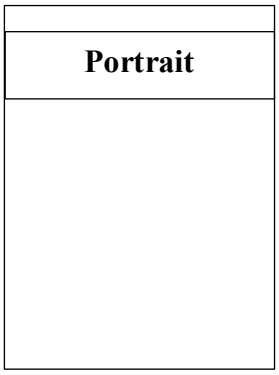
SECME students can use clip art, electronic visual graphics, magazine clippings, newspaper clippings, crayons, markers, color pencils, color pen, and paint.

- Grades PreK-2 are required to submit a video explanation of their vision board no longer then 2 to 4 minutes in duration.

- Grades 3-12 are required to submit a one paragraph description of their vision board

SECME students put your vision board on an 8.5" × 11" white paper. The page layout (or the paper orientation) can be either landscape or portrait.





The Vision Board will be judged on the following categories:

1. Paper Size Requirement (8.5" × 11")
2. Competition Theme (SECME: STEM Champions)
3. Appearance, Effort, Creativity, Originality
4. Video explanation of your Vision Board (PreK-2nd grades)
5. One paragraph explanation of your Vision Board (3rd-12th grades)

APPENDIX - FORMS & REPORTNG

EASY PRINT, JUDGES EVALUATION INSTRUCTIONS AND FORMS

COMPETITION BY DIVISION	PRINT/DISTRIBUTE PAGE NUMBERS
MOUSETRAIP CAR – ELEMENTARY	58, 59, 60, 61, 75
MOUSETRAP CAR – MIDDLE/HIGH	58, 59, 62, 63, 64, 65, 68, 69, 71, 72, 76
WATER BOTTLE ROCKETRY – ELEMENTARY	58, 60, 61, 73, 74, 77
WATER BOTTLE ROCKETRY – MIDDLE/HIGH	58, 62, 63, 64, 65, 68, 70, 71, 72, 73, 74, 78
VEX IQ ROBOTICS – ELEMENTARY/MIDDLE	58, 66, 67
VEX EDR ROBOTICS – MIDDLE/HIGH	58, 66, 67, 68, 70, 71, 72
ESSAY/VISION BOARD – PRE-K – 2ND	58, 81, 82
ESSAY/VISION BOARD – 3RD – 12th	58, 81, 83

Acceptable Fonts and Sample Cover Page - All Competitions. All Divisions

ACCEPTABLE FONTS:

Arial	This is an example of 12-point Arial font
Calibri	This is an example of 12-point Calibri font
Courier New	This is an example of 12-point Courier New font
Times New Roman	This is an example of 12-point Times New Roman font

Sample Cover Page – Essay/Vision Board

Title: *SECME: STEM CHAMPIONS*

Student Name (First and Last Name)
Student Grade
Student Email

Official School Name
School Address, City, State, Zip Code
Official District Name

SECME School Coordinator's Name or Teacher's First and Last Name
Coordinator/Teacher email address
Date of SECME Competition

Sample Cover Page – All Team Competitions

Title: (Example) SECME Engineering Design Competition: Mousetrap Car Written Report

Division: (Example) Elementary School Division

Team Name: Mouseketeers

Student 1 Name (First and Last Name)
Student Grade
Student Email

Student 2 Name (First and Last Name)
Student Grade
Student Email

Student 3 Name (First and Last Name)
Student Grade
Student Email

Official School Name
School Address, City, State, Zip Code
Official District Name

SECME School Coordinator's Name or Teacher's First and Last Name
Coordinator/Teacher email address
Date of SECME Competition

Mousetrap Car Materials List

Official School Name: **Team Name:**

Official District Name:

Please check Competition Division: Elementary School ☐ Middle School ☐ High School ☐

Part Name	Description	Purchase/Recycled	Cost
		Purchased ☐ Recycled ☐	
		Purchased ☐ Recycled ☐	
		Purchased ☐ Recycled ☐	
		Purchased ☐ Recycled ☐	
		Purchased ☐ Recycled ☐	
		Purchased ☐ Recycled ☐	
		Purchased ☐ Recycled ☐	
		Purchased ☐ Recycled ☐	
		TOTAL	

Note: Scan and include copies of all receipts. Duplicate if additional pages are needed. Total # of pages submitted: _____

Written Report Evaluation Instructions (MTC & WBR) - Elementary School Division

As a part of the Engineering Design Competition, the SECME student team is required to write a Written Report describing the design, construction, and operation of the Mousetrap Car and/or Water Rocket. The main body of the report should be a maximum of 1-2 pages and must be age appropriate.

YOUR WRITTEN REPORT SHOULD BE A REFLECTION OF THIS YEAR'S EFFORTS BY YOUR SECME STUDENT TEAM. EVIDENCE OF PLAGIARISM OR RE-SUBMISSION OF PREVIOUS YEARS' REPORTS WILL RESULT IN ZERO SCORE.

STRUCTURE

1. Cover page
    a. Title of the SECME Written Report.
    b. SECME Competition Division
    c. SECME Team Name
    d. Each SECME student team member's name, grade, and email
    e. SECME team's official school name and address, city, state and zip
    f. Official School District Name
    g. SECME School Coordinator's (or Teacher's) name and email
    h. Date (Date of SECME competition)
2. Double-spaced text
3. One-inch borders at the top, bottom, and on each side
4. 12 pts. acceptable standard font, computer typed
5. Report is neat; pages are numbered (do not number cover page)

CONTENT

1. Writing includes an original introduction and conclusion
2. Writing includes ideas that are fully developed, fully supported, and describe the design, construction and operation of the vehicle
3. Writing is logical and coherent as a whole
4. Mousetrap Car and Water Bottle Rocketry must include hand written calculations. If Written Report is for Water Bottle Rocketry, see Calculations Manual at www.secme.org >Resources & Forms > Student Resources>Water bottle rocketry Calculation Manual
5. (MTC Only) Written report should include completed MTC Materials List with receipts (These should not be counted in the 2-page limit).

MECHANICS, SPELLING & GRAMMAR

Written Report should reflect the SECME team's professionalism and pride by being submitted:

1. Free of punctuation errors
2. Free of spelling errors
3. Free of sentence errors (misplaced sentence parts, subject/verb agreement, sentence fragments, run-ons, etc.)

NOTE: SECME Competition hosts will submit the Written Reports to the SECME National Office during the Registration period. Written Reports **not submitted** will receive a **zero score**.

Written Report Judges Evaluation Form (MTC/WBR)– Elementary Division

Official School Name			
Official School District		**State**	
Competition Event Please check one	☐ **Mousetrap Car**	☐ **Water Bottle Rocketry**	
SECME Team Name or Rocket Name			
Student Full Name #1		**Grade**	
Student Full Name #2		**Grade**	
Student Full Name #3		**Grade**	
Judge's Name		**Date**	

STRUCTURE (0 – 10 pts) **Points**

- Cover Page (0 – 5 pts) **/5**
  - Title of report, division, team name, each team member's name, grade, email
  - Official school name and address, official district name, SECME Coordinator/Teacher name
  - Date
- 1" margins (0 – 1 pts) **/1**
- 12 pt./Standard Font/Computer Typed (0 – 1 pts) **/1**
- Double-spaced Text (0 – 1 pts) **/1**
- Report is neat (0 – 1 pts) /1
- Pages are numbered and in order (0 – 1 pts) **/1**

STRUCTURE TOTAL (*maximum 10 pts*) **/10**

CONTENT (0 – 60 pts):

- Writing includes an original introduction (0 – 10 pts) **/10**
- Writing includes ideas that are fully developed, supported and describe the design, construction, and operation of the car (0 – 15 pts) **/15**
- Writing is logical and coherent as a whole (0 – 15 pts) **/15**
- Writing includes an original close (0 – 15 pts) **/15**
- Handwritten Calculations (0 – 5 pts) **/5**

CONTENT TOTAL (*maximum 60 pts*) **/60**

MECHANICS, SPELLING & GRAMMAR (0 – 30 pts):

- Writing is free of punctuation errors (age-appropriate) (0 – 5 pts) **/5**
- Writing is free of spelling errors (age-appropriate) (0 – 10 pts) **/10**
- Writing has correct subject/verb agreement and free of sentence errors, misplaced sentence parts, sentence fragments, run-ons, etc. (age-appropriate) (0 – 15 pts) **/15**

MECHANICS, SPELLING & GRAMMAR TOTAL (*maximum 30 pts*) **/30**

OVERALL TOTAL (*maximum 100 pts*) **/100**

MTC Materials List & receipts were included in Written Report ☐ **NO** ☐ **YES TOTAL COST** **$**_____

_____

Judge's Notes: (please use reverse side for additional comments)

Technical Report Evaluation Instructions (MTC & WBR) - MIDDLE & HIGH SCHOOL

The technical report is a very important part of being a professional engineer. In addition to designing and building new technologies, engineers must be able to communicate their ideas, efforts, processes, progress, and results in a professional written format. Each SECME student team is required to write a Technical Report describing the design, construction, and operation of their vehicle.

YOUR TECHNICAL REPORT SHOULD BE A REFLECTION OF THIS YEAR'S EFFORTS BY YOUR TEAM. EVIDENCE OF PLAGIARISM OR RE-SUBMISSION OF PREVIOUS YEARS' REPORTS WILL RESULT IN ZERO SCORE.

STRUCTURE

1. The technical report must be double-spaced.
2. The technical report must be on 8½" × 11" white paper with 1" margins on all sides.
3. The technical report must be typed with a 12pt standard font (click here to see acceptable fonts).
4. The technical report must be neat with all pages numbered and in order.

CONTENT

1. COVER PAGE (1 page): The technical report must include a cover page that is formatted as specified in the technical report breakdown on the following page
1. TABLE OF CONTENTS (1 page)
2. ABSTRACT (½ -1 page)
3. INTRODUCTION
4. DESIGN OF VEHICLE
5. CONSTRUCTION PROCEDURE
6. OPERATION OF VEHICLE
7. CALCULATIONS

Main Body: These 4 Sections Should Be a Maximum of 7 Pages

8. CONCLUSION/RECOMMENDATIONS (1-2 pages)
9. ACKNOWLEDGMENTS (Optional)
10. APPENDIX *

MECHANICS

1. Correct punctuation, capitalization, and spelling
2. Use of past tense and passive voice
3. Report flows logically from one idea to the next with minimal fragmentation

AT ALL COMPETITIONS, THE MOUSETRAP CAR/ WATER BOTTLE ROCKET TECHNICAL REPORT WILL BE JUDGED ACCORDING TO THE TECHNICAL REPORT BREAKDOWN.

**For MTC, the completed Materials List and scanned receipts must be included in the Technical Report Appendix*

Technical Report Evaluation Breakdown (MTC & WBR)- Middle & High School Division Part (1 of 2)

Structure

1. Double-Spaced
2. 1" margins (all sides)
3. 12pt standard acceptable text font
4. Pages are numbered except title page and in order.
5. Report is neat
6. Cover page
    - Title of the SECME Technical Report is the following: (ex. SECME Engineering Design Competition: Mousetrap Car or Water Bottle Technical Report)
    - SECME Competition Division (ex. High School Division)
    - SECME Team Name
    - Each SECME student team member's name, grade, and email
    - SECME team's official school name and address
    - Official School System/District Name
    - SECME School Coordinator's (or Teacher's) name and email
    - Date (Date of SECME competition)

Content

Table of Contents

1. Professionally indicates page numbers where each part of the report can be located
2. Maximum one page

Abstract

1. This is summary that includes the essential points of the purpose, methods, scope, results, conclusions, and future recommendations
2. This is your chance to convince the readers that they should continue reading. Make sure your writing is clear and concise.
3. The length of your abstract should be one-half to one page.

Introduction

1. Introduce the problem to be solved, your hypothesis, and your planned methods and design process to resolve the problem while adhering to the design requirements.

Design

1. Discuss the thoughts, design ideas, and experimental process by which you designed your vehicle.
2. Reference the data tables from the appendix to defend the conclusions which caused you to change your design (Water Bottle Rocket only).

Construction Procedure

1. List materials and tools utilized to construct the vehicle.
2. Clearly, describe the procedures taken to build your vehicle. so that someone with little knowledge of your vehicle would be able to understand your efforts. Can the Technical Report be used independently (or solely) to replicate the team's robot?

Technical Report Evaluation Breakdown (MTC & WBR) - Middle & High School Part 2 of 2

Operation

1. Explain the actions necessary to prepare the vehicle to operate as well as what actually happens when the vehicle is in motion. Be explicit about the steps taken.

Handwritten Calculations. ALL Calculations should be handwritten. If SECME student teams do not submit handwritten calculations, the team will receive **zero points**.

1. Handwritten calculations using the performance equation
2. If water bottle rocket, see the calculations manual (www.secme.org> Resources & Forms > Student Resources>Water bottle rocketry Calculation Manual)
   - ✈ Equations and constants used to design your rocket
   - ✈ High time assumptions
   - ✈ Handwritten mass flow rate calculations
   - ✈ Handwritten drag calculations
   - ✈ Handwritten final time aloft in seconds
   - ✈ Handwritten calculations will be scored on units, assumptions, accuracy, and etc.

Conclusion/Recommendations

1. Discuss the results of your final design and why it is superior to prior test designs or prototypes
2. Explain how future vehicles can further be improved and possibly a future hypothesis.

Appendix

1. **MUST** include three sketches of the vehicle. Choose the views that best capture the pertinent details of the vehicle. (front, side and top views)
2. **MUST** include all data tables and/or charts from experimentation comparing the various trials
3. **MUST** include MTC Materials List and supporting receipts or links (MTC Only)
4. References
5. Acknowledgements

Mechanics

1. Correct punctuation, capitalization, & spelling
2. Use of past tense and passive voice
3. Report flows logically from one idea to the next with minimal fragmentation

NOTE: SECME Competition hosts will submit the to the SECME National Office during the Registration period. Written Reports **not submitted** will receive a **zero score**.

Technical Report Judges Evaluation Form (MTC & WBR) – MIDDLE/HIGH SCHOOL

Please check which division: ☐ **Middle School** ☐ **High School**

Official School Name			
Official School District		**State**	
Competition Event Please check one	☐**Water Bottle Rocketry**	☐**Mousetrap Car**	
SECME Team Name or Rocket Name			
Student Full Name #1		**Grade**	
Student Full Name #2		**Grade**	
Student Full Name #3		**Grade**	
Judge's Name		**Date**	

STRUCTURE (0 - 10 pts):	**POINTS**
• 8 ½" x 11" white paper w/ 1" margins (0 – 1 pts)	**/1**
• 12 pt./Standard Font/Computer Typed (0 – 1 pts)	**/1**
• Double-spaced Text (0 – 1 pts)	**/1**
• Report is neat and thorough; pages are numbered and in order (0 – 2 pts)	**/2**
• Cover Page with required information (0 – 5 pts) (see TR Breakdown for specifics)	**/10**
CONTENT (0 - 70 pts):	
• Table of Contents (0 – 2 pts)	/2
• Abstract (0 - 2 pts)	/2
• Introduction (0 - 10 pts)	/10
• Design Background (0 - 15 pts)	/15
• Construction Procedure (0 - 10 pts)	/10
• Operation Procedure (0 -10 pts)	/10
• Calculations (0 - 10 pts)	/10
• Conclusions/Recommendations (0 - 10 pts)	/10
• Appendix (0 - 1 pts)	/1
CONTENT TOTAL (maximum 70 pts)	**/70**
MECHANICS (0 - 20 pts):	
• Correct grammar, punctuation, and spelling (0 – 10 pts)	**/10**
• Correct use of past tense and passive voice (0 – 5 pts)	**/5**
• Report flows logically with minimal fragmentation (0 - 5 pts)	**/5**
MECHANICS TOTAL (maximum 20 pts)	**/20**
TOTAL:	**/100**

MTC Materials List & receipts were included in Written Report ☐ **NO** ☐ **YES TOTAL COST** $_____

Judge's Notes: (please use reverse side for additional comments)

Engineering Notebook Evaluation Instructions (VEX EDR and VEX IQ)

One of the main missions of the VEX EDR and VEX IQ Robotics Competition is to help SECME students acquire real-world life skills that will benefit them in their academic and professional future. The Engineering Notebook is a way for teams to document how the VEX EDR and VEX IQ Robotics Competition experience has helped them to better understand the engineering design process while also practicing a variety of critical life skills including project management, time management, brainstorming, and teamwork. Each SECME student team's engineering notebook should be created through a concerted effort by the team to document their design decisions. SECME student teams should start their engineering notebooks early and update them often. Handwritten notes should be neatly written.

Engineering is an iterative process requiring students to recognize and define a problem, brainstorm and work through various stages of the design process, test their designs, continue to improve their designs and continue the process until a solution has been produced. During this process, students will come across obstacles, encounter instances of success and failure, and learn many lessons through their experiences. It is this process that students should document in their Engineering Notebook.

The Engineering Notebook is also an opportunity to document everything a SECME student team does and can serve as a historical guide of lessons learned and best practices which can benefit the SECME student team in future years. SECME Students may document any number of things in their Engineering Notebook such as: team meeting notes, design concepts and sketches, pictures, notes from competitions, biographies of the members of their team (students, teachers and mentors), observations and thoughts of team members throughout the season, team organization practices and any other notes that a team finds useful.

REQUIREMENTS (but not limited to):

1. Cover page
    a. Title of the Engineering Notebook – Example: SECME Engineering Design Competition: VEX EDR or VEX IQ Robotics Engineering Notebook)
    b. SECME Team Name
    c. Each SECME student team member's name, grade, and email
    d. SECME team's official school name and address (including city, state, and zip)
    e. Official School System/District Name
    f. SECME School Coordinator's (or Teacher's) name and email
2. Table of Contents
3. Brief description of each team member
    a. Describe each student team member's strengths and benefits to the team.
4. Design ideas
5. SECME Team meetings notes (daily enters)
6. Construction of the robot
7. Operation – describe how the robot has be designed to score/de-score pts
8. Problems encountered and methods to resolve them
9. Conclusion/Future Recommendations

Engineering Notebook Judges' Form (VEX EDR /VEX IQ ROBOTICS)

Please check which division: ☐ **Elementary School** ☐ **Middle School** ☐ **High School**

Official School Name			
Official School District		**State**	
SECME Team Name			
Student Name #1		**Grade**	
Student Name #2		**Grade**	
Student Name #3		**Grade**	
Judge's Name		**Date**	

Engineering Notebook should be clear and completely documented of the team's design and build process.

EVALUATION CATEGORIES **POINTS**

I. Layout (0 – 25 pts) _____/25
Is the engineering notebook organization easily understood?

II. Documentation (0 – 15 pts) _____/15
Regularly updated (ex. once week, biweekly, and monthly) documenting all teams efforts.

III. Design Process (0 – 40 pts) _____/40
Evidence of an iterative design process, highlighting the various phases the team's robot development through design.

IV. Sketches/Photographs (0 - 10 pts) _____/10
Does engineering notebook includes sketches/photographs?

V. Replication (0 – 10 pts) _____/10
Can the engineering notebook be used independently (or solely) to replicate the teams' robot?

TOTAL (The highest possible score is 100 pts) **____/100**

Judge's Notes: (please use reverse side for additional comments)

PowerPoint Presentation Evaluation Instructions
Mousetrap Car, VEX EDR Robotics, WBR - Middle & High School Divisions

All Mousetrap Car and VEX EDR teams that advance to the SECME National Student Competition Finals will be required to submit a PowerPoint presentation.

1. PowerPoint presentations are to be submitted to your local, state, district or regional competition host, according to their deadlines. If your SECME student team wins their Regional/District/State competition, their PowerPoint presentation will be submitted to the SECME national office by your competition host. **Failure to submit your PowerPoint presentation to your competition host will result in zero score, according to the Guidelines.** Please review "how to submit your PowerPoint presentation" section
2. Resubmissions are **not allowed**. Please review, edit, correct and save the version you want to use before submitting it to your competition host.

Required sections to include in PowerPoint presentation:

1. Introduction of SECME student team
   - Tell us about your SECME student teammates and coordinator. In this section explain the contribution of all the team SECME members.
2. Approach to Design Challenge
   - This is the research step explore different vehicle builds and/ or showcase the different design protypes you have developed to come up solutions for the 2019-2020 design requirements.
3. Construction & Operation
   - Discuss the design your team has chosen. Give us the highlights of your vehicle, for example, what are the capabilities or figures of your vehicle, what is innovative about your car design, and how does your vehicle work? In other words, how does your vehicle operate and be specific.
4. Materials & Cost (Mousetrap Car only)
   - In this section, list all materials used in the construction of your mousetrap car build and cost of each material used. Remember your maximum budget is $10.00
5. Conclusion and Recommendations.
   - What were the major findings from developing and constructing your vehicle?
   - Explain to us exactly what you would do differently to improve your currently design vehicle or create a different vehicle design.

YOUR POWERPOINT PRESENTATION SHOULD BE A REFLECTION OF THIS YEAR'S EFFORTS BY YOUR TEAM. EVIDENCE OF PLAGLARISM OR RE-SUBMISSION OF PREVIOUS YEARS' PRESENTATION WILL RESULT IN ZERO SCORE.

PowerPoint Judges Evaluation Form (MTC) - Middle & High School

Please check which division: ☐ **Middle School** ☐ **High School**

Official School Name			
Official School District		**State**	
SECME Team Name			
Student Full Name #1		**Grade**	
Student Full Name #2		**Grade**	
Student Full Name #3		**Grade**	
Judge's Name		**Date**	

EVALUATION CATEGORIES: (**0 – 100 pts**) **POINTS**

I. Introduction of SECME student team (0 – 5 pts) /5
- ✓ SECME student teammates and coordinator introduction.
- ✓ Explain the contribution of all the team SECME members.

II. Approach to Design Challenge (0 -25 pts) /25
- ✓ Clearly shows research alternative designs/protypes for vehicle

III. Material & Cost (0-20 pts) /20
- **a.** Document all materials used and all cost related to materials used.
- b. Within $10.00 budget

IV. Construction & Operation (0 -25 pts) /25
- ✓ A clear description of the design the mousetrap car.
- ✓ A clear description of mousetrap car operation.

V. Conclusion & Recommendations (0 -25 pts) /25
- ✓ Clearly states all major findings from the competing car
- ✓ Clear explanation of any improvements for current design or alternate design vehicle.

Total Score (maximum 100 pts) /100

Judge's Comments (please use back page for additional space)

PowerPoint Judges Evaluation Form (VEX EDR/WBR) - Middle & High School

Please check which division: ☐ **Middle School** ☐ **High School**

Please check which competition event: ☐ **VEX EDR** ☐ **WBR**

Official School Name			
Official School District		**State**	
SECME Team Name			
Student Full Name #1		**Grade**	
Student Full Name #2		**Grade**	
Student Full Name #3		**Grade**	
Judge's Name		**Date**	

EVALUATION CATEGORIES: **(0 – 100 pts)** **POINTS**

I. Introduction of SECME student team (0 – 10 pts) **/10**
- ✓ SECME student teammates and coordinator introduction.
- ✓ Explain the contribution of all the team SECME members.

II. Approach to Design Challenge (0 -30 pts) **/30**
- ✓ Clearly shows research alternative designs/protypes for vehicle

III. Construction & Operation (0 -30 pts) **/30**
- ✓ A clear description of the design the mousetrap car.
- ✓ A clear description of mousetrap car operation.

IV. Conclusion & Recommendations (0 -30 pts) **/30**
- ✓ Clearly states all major findings from the competing car
- ✓ Clear explanation of any improvements for current design or alternate design vehicle.

Total Score (maximum 100 pts) **/100**

Judge's Comments (please use back page for additional space)

Technical Drawing Evaluation Instructions – Middle/High School Division
Mousetrap Car, VEX EDR, Water Bottle Rocketry

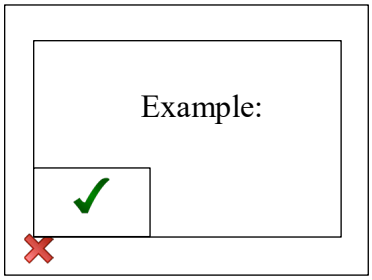
As a part of the Engineering Design Competition, each team is required to prepare a scaled drawing depicting the vehicle that they have designed and built.

ENGINEERING PAPER REQUIREMENTS

1. The engineering paper is required to be the standard ANSI C 17" × 22" paper (see **FAQ** for online paper vendor)
2. The engineering paper must be a plain, non-grid, 16-pound vellum sheet.
3. There must be a 1" border on all sides of the engineering paper.
4. A ***legend*** is to be drawn in the bottom left corner of the technical drawing inside the 1" border of engineering paper.

REQUIREMENTS GUIDELINES:

1. **NO MOUNTING OR FRAMES ALLOWED BUT DRAWING MAY BE LAMINATED FOR PROTECTION IF DESIRED.**
2. Allowing for the required 1" border on all sides, the actual drawing is to cover the exposed area of 15" × 20."
3. The Technical Drawing entry is required to illustrate the actual vehicle built by the team (photographs and computer-generated drawings will **NOT** be allowed).
4. All dimensions are required to be illustrated on the drawing.
5. The scale and the units are required to be indicated on the drawing.
6. The team's Technical Drawing is required to show front, side, and top views.
7. All parts of the vehicle are required to be labeled.
8. Ink pens, pencils or markers may be used.
9. A ***legend*** is to be drawn in the bottom left corner of the drawing inside the 1" border with the following information:
    - **SECME Competition Division**
    - **SECME Student Team Name**
    - **Official School Name**
    - **Official School District Name**
    - **SECME Student Team Members' Names and Grade Levels**
    - **SECME School Coordinator's Name**
    - **Date of Competition**



AT ALL COMPETITIONS, THE CAR, ROBOT and ROCKET DRAWINGS WILL BE JUDGED ON:

- ENGINEERING PAPER REQUIREMENTS
- RESEMBLANCE (between the final version of the vehicle and the technical drawing)
    - Be sure to have a completed technical drawing with **all views** (**front, side, and top views**) of the vehicle illustrated. If **all views** (**front, side, and top views**) are not illustrated on the technical drawing the team will receive **zero points**.
- SCALE
- NAMING/LABELING (of all of the parts)
- APPEARANCE/NEATNESS

Technical Drawing Judges Evaluation Form - Middle & High School Division

Please check which division: ☐ **Middle School** ☐ **High School**

Official School Name			
Official School District		**State**	
Please check Competition Event	☐ **Mousetrap Car** ☐ **VEX EDR** ☐ **Water Bottle Rocketry**		
SECME Team Name			
Student Full Name #1		**Grade**	
Student Full Name #2		**Grade**	
Student Full Name #3		**Grade**	
Judge's Name		**Date**	

ENGINEERING PAPER REQUIREMENTS (0 – 10 pts): **POINTS**

- ANSI C Size Engineering Paper (17" × 22") /2
- Measure 1" Border all 4 sides (draw within 16" × 21" area) /2
- 16-pound Vellum Paper /1
- Title and legend (located correctly on drawing) /5

TOTAL ENGINEERING PAPER REQUIREMENTS (*max 10 pts*) **/10**

EVALUATION CATEGORIES (0 – 90 pts):

I. **RESEMBLANCE: (0 – 30 pts)** /30
The accuracy to which the vehicle Drawing illustrates the actual vehicle designed and built by the team.

II. **SCALE : (0 – 20 pts)** /20
The proportions in the Drawing correctly relate to and represent the team's actual vehicle.

III. **NAMING/LABELING: (0 – 20 pts)** /20
The correctness of the names/labels of all of the parts in the Drawing of the vehicle.

IV. **APPEARANCE/NEATNESS: (0 – 20 pts)** /20
The quality of the visual presentation of the vehicle Drawing.

EVALUATION TOTAL (*max 90 pts*) **/90**

TOTAL (*max 100 pts*) **/100**

Judge's Notes: (please use reverse side for additional comments)

Patch Design Challenge Judges Evaluation Instructions (WBR) – All Divisions

WHAT IS A PATCH? A patch is a creative display that reflects the dedication and mission of the SECME student team. This symbolic picture must comply with the following patch design challenge:

NOTE: Any patch design deemed inappropriate will be removed from the competition and the SECME team will receive zero patch design points.

THE PATCH DESIGN WILL BE JUDGED ON THE FOLLOWING CRITERIA:

1. Paper Size Requirement (13x13 poster board)
2. SECME Theme-SECME: STEM Champions
3. Appearance
4. Creativity
5. Explanation of Patch

Patch Design Challenge (WBR) – Judges Evaluation Form

Please check which division: ☐ **Elementary School** ☐ **Middle School** ☐ **High School**

Official School Name			
Official School District		**State**	
SECME Rocket Name			
Student Name #1 (Mission Captain)		**Grade**	
Student Name #2 (Mission Specialist)		**Grade**	
Student Name #3 (Mission Specialist)		**Grade**	
Judge's Name		**Date**	

EVALUATION CATEGORIES **POINTS**

I. PAPER SIZE REQUIREMENT (0 – 5 pts) /5
Correct patch size is 13" × 13"

II. SECME THEME (SECME: STEM Champions)- (0 – 20 pts) /20

Incorporation of SECME's competition theme (and SECME team name)

III. APPEARANCE (0 – 20 pts) /20
Attractiveness and neatness of the patch

IV. CREATIVITY (0 - 25 pts) /25
Uniqueness of the information depicted

V. EXPLANATION OF PATCH (0 – 30 pts) /30
Description that explains each part or ideas of the patch (on the back of patch)

TOTAL (maximum 100 pts) /**100**

Judge's Notes: (please use reverse side for additional comments)

Construction and Operation Judges Evaluation Form (MTC)- ELEMENTARY

Official School Name			
Official School District		**State**	
SECME Team Name			
Student Name #1		**Grade**	
Student Name #2		**Grade**	
Student Name #3		**Grade**	
Judge's Name		**Date**	

Calculation Formulas

$$P = \frac{D}{L} \times \frac{C_H}{C} \times \frac{D}{T}$$

$$F = \frac{P}{P_H} \times 100$$

L	cm
C	$
C_H	$
D_1	cm
T_1	s
P_1	
D_2	cm
T_2	s
P_2	
P_H	

Mousetrap Car Performance Point Score: $F =$ _____

Final Score = (Performance Score) × **0.65** + (Written Report) × **0.35**

Final Score = _____

NOTE: The maximum mousetrap car final score is **100 pts**.

Judge's Notes: (please use reverse side for additional comments)

Construction and Operation Judges Evaluation Form (MTC) – MIDDLE/HIGH SCHOOL

Please check which division: ☐ **Middle School** ☐ **High School**

Official School Name			
Official School District		**State**	
SECME Team Name			
Student Full Name #1		**Grade**	
Student Full Name #2		**Grade**	
Student Full Name #3		**Grade**	
Judge's Name		**Date**	

Calculation Formulas

$$P = \left(\frac{w}{W}\right) \times \left(\frac{D}{L}\right) \times \left(\frac{C_H}{C}\right) \times \left(\frac{D}{T}\right)$$

$$F = \frac{P}{P_H} \times 100\%$$

w	**27.8 g**
W	**g**
C	**$**
C_H	**$**
L	**cm**
D_1	**cm**
T_1	**s**
P_1	
D_2	
T_2	**s**
P_2	
P_H	

Technical Report (*max 100 pts*)	
Drawing (*max 100 pts*)	
PowerPoint (*max 100 pts*)	
Art of Engineering* (*max 100 pts*)	
Best Performance Run, F (*max 100 pts*)	

FINAL SCORE:

$$Final\ Score = Performance\ (30\%) + PowerPoint(10\%) + Drawing(20\%) + Report(20\%) + Art\ of\ Engineering^{*}(20\%)$$

Final Score = _____**pts**

NOTE: The maximum mousetrap car final score is **100 pts**.

For entries which do not include the MTC Materials List, the value of Cost (C) shall be double the highest Cost (C_H)

***The Art of Engineering will be held during National Student Competition Finals Only. For Local/Regional Competitions, the recommended weight for competition components (excluding AoE) is:**

$$Final\ Score = Performance\ (40\%) + PowerPoint\ (10\%) + Drawing\ (20\%) + Report\ (30\%)$$

Judge's Comments (please use back page for additional space)

Construction and Operation Judges Evaluation Form (WBR) - ELEMENTARY

Official School Name			
Official School District		**State**	
SECME Rocket Name			
Student Name #1 (Mission Captain)		**Grade**	
Student Name #2 (Mission Specialist)		**Grade**	
Student Name #3 (Mission Specialist)		**Grade**	
Judge's Name		**Date**	

WATER BOTTLE ROCKET REQUIREMENTS: **Requirement Met (check one):**

Overall Height: (maximum 76 cm) Yes ☐ No ☐

Fin Width Distance (from pressure vessel): (maximum 10 cm) Yes ☐ No ☐

Nose Cone Tip Radius: (minimum 1.5 cm) Yes ☐ No ☐

Throat Exit Clearance: (minimum 7.5 cm) Yes ☐ No ☐

SCORING: **Hang-time (s)**

JUDGE #1: _____ _____

JUDGE #2: _____ _____

JUDGE #3: _____ _____

AVERAGE HANGTIME (SEC): _____

FINAL SCORE CONSTRUCTION AND OPERATION:

$$\frac{\text{Average SECME team Hangtime (s)}}{\text{Maximum Hangtime (s)}} \times 100\% = \_\_\_\_\_$$

FINAL SCORE:

$$\text{Final Score} = \text{Hangtime Score } (0.60) + \text{Written Report } (0.15) + \text{Patch Design } (0.25)$$

Final Score = _____pts

NOTE: The maximum final elementary Water Bottle Rocketry score must range from **0 - 100 pts**.

Judge's Notes:

Construction and Operation Judges Evaluation Form (WBR) –MIDDLE/HIGH

Please check which division: ☐ **Middle School** ☐ **High School**

Official School Name			
Official School District		**State**	
SECME Rocket Name			
Student Name #1 (Mission Captain)		**Grade**	
Student Name #2 (Mission Specialist)		**Grade**	
Student Name #3 (Mission Specialist)		**Grade**	
Judge's Name		**Date**	

WATER BOTTLE ROCKET REQUIREMENTS: **Requirement Met (check one):**

Overall Height: (maximum 76 cm)	Yes ☐	No ☐
Fin Width Distance (from pressure vessel): (maximum 10 cm)	Yes ☐	No ☐
Nose Cone Tip Radius: (minimum 1.5 cm)	Yes ☐	No ☐
Throat Exit Clearance: (minimum 7.5 cm)	Yes ☐	No ☐

SCORING: **Hang-time (s)**

JUDGE#1:_____ _____

JUDGE#2:_____ _____

JUDGE#3:_____ _____

AVERAGE HANGTIME (s): _____

FINAL SCORE CONSTRUCTION AND OPERATION:

$$\frac{\text{Average Team Hangtime (sec)}}{\text{Maximum Hangtime (sec)}} \times 100 = \_\_\_\_\_$$

FINAL SCORE:

$$\text{Final Score} = \text{Hangtime Score}(0.55) + \text{Patch Design}\ (0.10) + \text{Technical Report}\ (0.20) + \text{Technical Drawing}(0.10) + \text{PowerPoint}\ (0.05)$$

Final Score = _____pts

NOTE: The maximum final Water Bottle Rocketry score must range from **0 - 100 pts**.

_____

Judge's Notes: (please use reverse for additional comments)

JUDGES EVALUTION INSTRUCTIONS (AOE)

Each SECME student team will be REQUIRED to participate in a new competition component **ONLY AT SECME NATIONAL STUDENT COMPETITION FINALS** called "The Art of Engineering."

This competition component showcases the **ART** in SECME student team engineering design of their car/robot.

The SECME student team will display their car/robot and technical drawing.

Each SECME student team will explain the creative, innovative, and the aesthetics of their SECME team's car/robot.

Each SECME student team will give a 3 to 5-minute (every member must contribute for the team to get all possible points) pitch on their car/robot from the artistic and innovative perspective. In order words, sell your car/robots' capabilities in a creative and informative way.

AT NATIONAL COMPETITIONS ONLY, THE ART OF ENGINEERING WILL BE JUDGED ON:

- Creative and Innovative
- 3 to 5-minutes Pitch, Teamwork, and Delivery
- Appearance

Judges Evaluation Form (AOE)

Please check which division: ☐ **Middle School** ☐ **High School**

Official School Name			
Official School District		**State**	
Competition Event	☐ **Mousetrap Car**	☐ **VEX EDR Robotics**	
SECME Team Name			
Student Full Name #1		**Grade**	
Student Full Name #2		**Grade**	
Student Full Name #3		**Grade**	
Judge's Name		**Date**	

EVALUATION CATEGORIES: **(0 – 100 pts)** **POINTS**

1. **Creative and Innovative (0 – 40 pts)** **/40**
   a. Is the design of the car/robot creative and innovative?

2. **3 to 5-minute Pitch, Teamwork, and Delivery (0 -50 pts)** **/50**
   a. Each student member contributes to the pitch.
   b. The team sold their car or robot design and capabilities.
   c. Judges' overall experience with the teams' interactive

3. **Appearance (0 - 10 pts)** **/10**
   a. Car/Robot on display

Total Score (maximum 100 pts) **/100**

Judge's Comments (please use back page for additional space)

Essay/Vision Board Judges Evaluation Instructions – ALL DIVISIONS

COMPETITION REQUIREMENT:
To express your career aspirations both written and visually as follows: How has participation in SECME "**made you a STEM champion**?" What SECME activities that involve **S**cience, **T**echnology, **E**ngineering, **A**rt or **M**athematics do you find fun? Why are they fun? What kinds of careers use **S**cience, **T**echnology, **E**ngineering, **A**rt and **M**athematics? What level of education do you need to pursue these careers? This SECME competition will give you the opportunity to express your explorations.

2. Grades **PreK-2**. Create a vision board on paper (electronically or by hand) of your SECME experience and goals. Next, working with your SECME Coordinator you will create a 2-4 minute video explaining what your vision board represents. Grades PreK-2, complete Phase 5 only. The essay/vision board must include the following:
    a. Required cover page
    b. 2-4 minute video explaining your vision board
    c. Vision Board drawing is 1 page in length and can be positioned either portrait or landscape
    d. Total pages - 2. Cover page and the vision board

    Grades **3-12.** Express your SECME experience in writing and visually depict your explorations by creating a vision board on paper. Grades 3-12 must complete all five phases. The essay/vision board must include the following:
    b. Required cover page
    e. Essay is 2 - 3 pages in length
    f. Write a one paragraph description of your vision board (on a separate page-not on the vision board page)
    g. Vision Board drawing is 1 page in length and can be positioned either portrait or landscape
    h. Maximum pages of essay and vision board, including cover page is 6

SECME Essay/Vision Board Judges' Evaluation Form - Grades PreK-2

Official School Name			
Official School District		**State**	
Student Name		**Grade**	
Judge's Name		**Date**	

Essay Organization

Includes required cover page, vision board	/5
Paper size Requirements	/5
Total Organization (10 pts)	/10

Vision Board

Appearance/Effort (0-30 points)	/30
Creativity/Originality (0-30 points)	/30
Video description of vision board (0-30 points)	/30
Total Vision Board (90 pts)	/45
Total Points Earned / Out of 100 Possible Points	/100

SECME Essay/Vision Board Judges' Evaluation - Grades 3-12

Please check which division: ☐ **Elementary School** ☐ **Middle School** ☐ **High School**

Official School Name			
Official School District		**State**	
Student Name		**Grade**	
Judge's Name		**Date**	

Essay Organization

Includes required cover page, essay, vision board and vision board explanation. Essay is double spaced, 1 inch margins, approved 12 point font. Essay includes introduction, body, conclusion and bibliography

TOTAL ORGANIZATION (0-5 pts) _____/5

SECME Experience

Writer explains how their SECME experience will help prepare them for a STEM career _____/25
Writer identifies how their SECME experience is the spark for their interest in STEM _____/20
Writer explains the STEM discipline or activity that captures their interest _____/20

TOTAL SECME EXPERIENCE (0-65 pts) _____/65

Writing Style

Writing is age appropriate, logical, cohesive and flows. Ideas are fully developed and supported in their bibliography. The writer's voice is strong, explaining how their SECME experience has helped them with their career goals.

TOTAL WRITING STYLE (0-10 pts) _____/10

Format, Punctuation and Mechanics

Writing is free of (age-appropriate) punctuation errors
Writing is free of (age-appropriate) sentence errors (misplaced sentence parts, subject/very agreement, sentence fragments, run-ons, etc.)
Writing is free of (age-appropriate) spelling errors

Total Writing Style (0-20 pts) _____/20

TOTAL ESSAY (0-100 pts) _____/100

Vision Board (0 points)

Appearance/Effort (0-30 points) _____/30
Creativity/Originality (0-30 points) _____/30
Explanation of vision board (0-40 points) _____/40

Total Vision Board (0-100 pts) _____/100

TOTAL ESSAY/VISION BOARD (0-200 pts) _____/200

Consent form for the use of photographs or video

SECME, Inc. recognizes the need to ensure the welfare and safety of all young people taking part in any activity associated with our organization.

Photographs/videos of your child participating in SECME activities and competitions are often sent to our National Office. The SECME National Office will not permit photographs, video or other images of your child/ren to be posted as listed below, without the consent of you, the parent/caregiver. As your child will be taking part in the SECME program throughout the 2019-2020 school year, we would like your consent to take and/or post photographs/videos of your child. It is likely that these images may be used as:

- a record of the activity or the event
- in a written evaluation report of the activity or event
- publicity material for further activities or events on leaflets/websites/magazines or other forms of social media
- future grant applications

We would be grateful if you would return this form to your child's SECME teacher. They will forward the form to our office.

I _____ consent to / do not consent to
(type/print name of parent/caregiver)

SECME, Inc. using photographs or videos of

_____
Name of child

_____
Name of School

_____
Name of SECME Teacher

_____
Signature of parent/caregiver Date

Minor and Adult Room Waiver

SECME National Student Competition Finals, June 16-19, 2020

Housing addendum for **The University of Alabama Tuscaloosa**
(Housing Location)

Please read carefully, check the appropriate box based on the age of the student listed below. Sign and return to your child's teacher, not later than April 18, 2020

_____ Age as of June 16, 2020____
Name of SECME Student (type or print)

Please check this box below if the above named SECME student is 18 years old or older as of June 16

☐ I acknowledge and consent to the possibly that (the above-named student) may be residing with another high school student competing in the Competition that is minor, under 18 years of age.

Please check this box below if the above named SECME student is under 18 years old as of June 16

☐ I acknowledge and consent to the possibly that (the above-named student) may be residing with another high school student competing in the Competition that is an adult, 18 or 19 years of age.

Parent/Guardian Name_____
Please type or print

Parent/Guardian Signature_____ Date_____

Grievance Form

for Review by Judges

SECME Competition Host _____

SECME Competition Event _____ **Division** _____

SECME Team Name _____

Official School Name _____

Official School District Name _____

SECME School Coordinator/Teacher Leader _____

SECME School Coordinator Preferred Email _____

SECME School Coordinator Telephone _____

Competition Rule or Procedure in Question _____

_____

_____

Specific Concern _____

_____

_____

_____

_____

(Use back or 2nd sheet if needed to document fully)

_____

Submitted by: (Name) **Date**

Definitions Page

We have added this page in the hopes that it will help clear up any misunderstanding regarding terms used in this document. If after thoroughly reviewing these guidelines you have additional questions or concerns, please do not hesitate to contact Dr. Julaunica Tigner at julaunia.tigner@coe.gatech.edu

These guidelines are for the 2019-2020 competition year. You should NOT refer to any previous year guidelines.

1. Registration (formerly Certification of Competition Winners) of 1st place winning SECME students and student teams
    a. Competition Hosts REGISTER 1st place winners and will submit the SECME students/student teams written reports, technical reports, engineering notebooks (VEX EDR and IQ Robotics), essays/vision boards, vision board videos and PowerPoint presentations. Important reminder. Competition Hosts will NOT be allowed to submit reports etc. after the registration period (March 2 – April 10) closes.
    b. SECME School Coordinators SUBMIT winning SECME students/ student teams photograph consent form, minority adult room waiver, and chaperone name and contact information.

2. SECME School Coordinators should identify a chaperone **(one chaperone per team)** to accompany their team/s to the SECME National Student Competition Finals. If your team is a mixed-gender team, we *encourage* you to send two chaperones, of mixed gender (one male, one female). This is not a *requirement*; it is a recommendation. Please note that once on-site, all chaperones look after all SECME students while in the dormitories. Chaperones are strategically placed between rooms. Male chaperones reside on the same floor/building as male students and female chaperones reside on the same floor/building as female students.

3. Minority Adult Room Waiver. 18 is the legal age for an adult. Occasionally, an 18-year-old, even a 19-year-old is a 12th grader in high school and this SECME student is competing in our competition. The SECME National Engineering Design Student Competition is a residential conference. We take care to house separately middle schoolers from high schoolers. Providing this information will assist us greatly.

4. VEX EDR Robotics - If VEX EDR Robotics is **not** part of your State or Regional Competition (therefore you have no 1st place winner) but you have individual SECME participating schools that include VEX EDR Robotics as part of their SECME activities, these schools may register to participate and compete at SECME National Student Competition Finals. We are happy to announce that over the last few years there has been an increase in VEX EDR Robotics teams. However, to limit the financial increase to our Summer Institute host, as well as the SECME National Office, we are limiting the number of VEX EDR Robotics teams that can compete at SECME National Student Competition Finals. Only two (2) VEX EDR Robotics teams from each school in a district will be allowed to compete in the 2019-2020 SECME National Student Competition Finals.

5. VEX IQ Robotics - If VEX IQ Robotics is **not** part of your State or Regional Competition (therefore you have no 1st place winner) but you have individual SECME participating schools that include VEX IQ Robotics as part of their SECME activities, these schools may register to participate and compete in the non-traveling SECME National Student Competition Finals.

6. ***Prohibition of a 4th student***. The Summer Institute Host University has committed to sponsoring your 1st place winning SECME student team of only three (3) students. All activities and events during the SECME National Student Competition Finals are designed for three (3) students. Bringing an extra student is **strictly prohibited**. Each year the SECME National Office receives numerous telephone calls from SECME School Coordinators regarding this policy and each year, we have a violator!
   This year, we are enforcing a violation of this policy. Violation of this policy will result in your SECME student team not being eligible to place during the SECME National Student Competition Finals (disqualified). Violation of this policy can also include the possibility of no bed space available for the extra student. Additionally, financial responsibility for the extra student will be on the SECME Coordinator or Chaperone accompanying the extra student.

7. Each year the SECME National Office receives calls and/or grievances regarding your local, state and/or Regional SECME Competition. Our office **DOES NOT** get involved in your local competition. Your grievances, etc. are to be addressed to your competition host/judges.

Note: We hope you will find these Guidelines error-free; however, typos and mistakes do happen and occasionally these are not caught by our team. I apologize in advance if you find any typo, error, mistake, etc. Please bring the situation to my attention by emailing me at julaunica.tigner@coe.gatech.edu

Frequently Asked Questions

If you have any questions, or need help in these specific areas, please contact:

- Engineering Design (Mousetrap Car): The Engineering Faculty Consultant or Minority Engineering Program Director at the Member University which sponsors your Regional/State competition
- Engineering Design (Water Rocketry): The Engineering Faculty Consultant or Minority Engineering Program Director at the Member University which sponsors your Regional/State competition
- VEX Robotics: SECME National Office ● secme@coe.gatech.edu
- Essay: SECME National Office ● secme@coe.gatech.edu

The SECME National Office is always here to help. We can be reached at secme@coe.gatech.edu

1. **Can we purchase mousetrap kits from the SECME National Office?** *No; SECME no longer sells mousetrap kits. Instead SECME has adopted and encourage scratch-build designs to foster more creativity and innovation. Car kits can be purchased at the following places:*
    a. Pitsco (purchase 2L clear bottles)
    b. Midwest Supply company
    c. http://www.docfizzix.com/
    d. www.kelvin.com/Merchant2/merchant.mv?Screen=PROD&Product_Code=841315&Category_Code=ENDEEP
    e. www.sciencekit.com

2. **Where can we purchase the table tennis ball?** Please find one suggested supplier below:
https://www.amazon.com/MAPOL-3-star-Tennis-Premium-Training/dp/B00M9VXF50/ref=pd_ybh_a_3?_encoding=UTF8&psc=1&refRID=DBQNC1K0M65F1Y3KA9XA
(50-balls for $9.97 as of 09/03/2019)
3. **Where can we purchase the engineering paper?** Please find one suggested supplier below:
http://www.artsupply.com/Clearprint-Vellum-17-X-22-10-Sheet-Pack_p_45604.html
(10-sheets for $18.26 as of 09/03/2019)

4. **Our team won our Regional/State Competition but one of the team members is unable to attend National Competition Finals. Can we replace him/her?** *YES. A student team member can be replaced with another SECME student. The replacement student should be able to participate in the competition the team interview as outlined in the guidelines.*

5. **Our team won our Regional/State Competition but one of the team members is unable to attend National Competition Finals and we are NOT able to replace them. Can we still come and compete with two team members?** *You will be allowed to come to the National Student Competition to participate and get "the experience" but any team without 3 team members are not eligible to **place** in the competition.*

Frequently Asked Questions – con't

6. **Can parents/family members attend the National Student Competition Finals?** *YES. Parents and family members are always encouraged to attend SECME events. Transportation, meals and lodging will need to be secured by the individual family members. The Host University is only responsible for meals and lodging for the 3-member student teams and the authorized chaperone(s). A listing of local hotels will be provided.*

7. **We are the 1st place winning team from our SECME Regional/State Competition. Do we send in our Technical Drawing and Report prior to attending SECME National Competition Finals?** *Email your Technical Report (PDF format)* ***only*** *and physically bring your drawing with you to SECME National Student Competition Finals.*

8. **We have an active SECME program at our school but there will be no SECME Regional/District/State Competition in our area this year; can my students compete in the SECME National Student Competitions?** *YES.*

- *Engineering Design (Mousetrap Car) and VEX Robotics: Winning Regional/State teams travel to the National Student Competition Finals to compete. In the absence of such it will be your responsibility to raise the travel funds to send your 3-student team and chaperone to the SECME National Student Competition Finals to compete. Please contact us at secme@coe.gatech.edu for additional guidance.*

- *Essay: SECME programs can host a "local" Essay Competition and submit the winning essay to the SECME National Office for entry into the SECME National Student Competition Finals*

- *eCYBERMISSION: All students can participate in the eCYBERMISSION competition.*

9. **How does my SECME team determine the cost of 3D printing?** For 3D printing the SECME student team evaluates the cost of the material used to make the part for their vehicle.

Example: Polylactic acid (PLA) pellets can be purchased for the price of ~$10.00 per 1 kg. If the SECME student team only used 1 g, the following calculation they would need to do to determine the cost of their 3D component:

$$\frac{\$10.00}{1\ kg} \times 1\ g \times \frac{1\ kg}{1000\ g} = \$0.01$$

The following is link to how much 3D materials cost in 2019:
https://all3dp.com/2/how-much-do-3d-printer-materials-cost/

Frequently Asked Questions – con't

10. How does my SECME team log their purchases on their material list?

Example: Balloons were purchased for $10.99 for 100 balloons. If the SECME student team only used 2 balloons, the following will be the calculation they would need to do in order to determine the cost:

$$\frac{\$10.99}{100\ ballons} \times 2\ balloons = \$0.22\ (for\ 2\ balloons)$$

This would be example on how to fill out the material list.

Part Name	Description	Purchase/Recycled	Cost
Balloons	$10.99 for 100 balloons $\frac{\$10.99}{100\ balloons} \times 2\ balloons = \$0.22\ (2\ balloons)$	**Purchased** ☒ **Recycled** ☐	*$0.22 (2 balloons)*

Concerns and Complaints - *Please complete and submit the Competition Grievance Form to the SECME Local/Regional/District/State Competition Host. Grievances should be handled at the local level.*

Note: Please follow any additional instructions or procedure that maybe implemented by your local SECME (Local/District/State/Regional) Competition Host.

SECME Partner National Competitions

Several of SECME partners provide National Student Competitions. We take this opportunity to provide informational references for these student competitions.

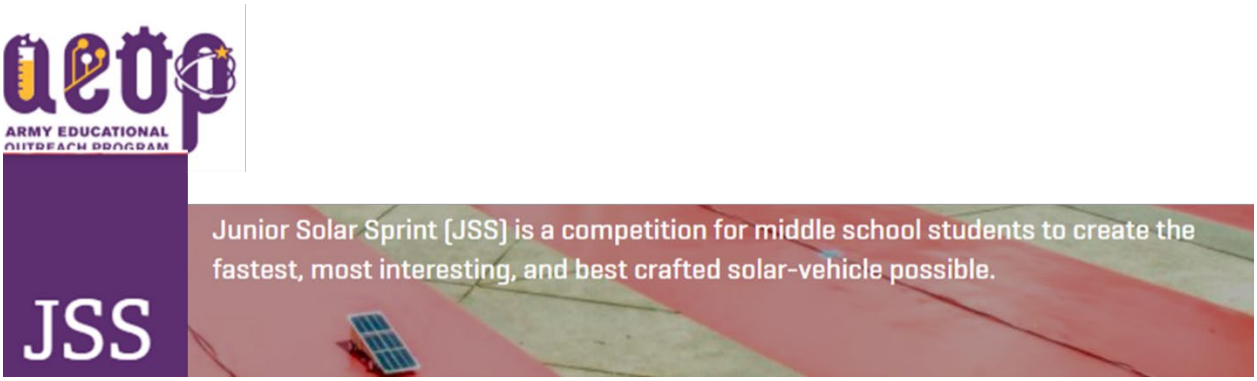
- eCYBERMISSION

Taking the science fair out of the auditorium and into cyberspace…

eCYBERMISSION is a web-based Science, Technology, Engineering and Mathematics competition for 6th, 7th, 8th, and 9th grade teams. Your team will propose a solution to a real problem in your community and compete for State, Regional and National Awards.

- Junior Solar Car Sprint

JSS is an educational program for 5th through 8th grade students with the goal of creating the fastest, most interesting, and best crafted solar-vehicle possible. Click **here** for more information. Click **here** for instructional video. Click **here** for student resources, click **here** for coaches' resources, and **here** for guidelines.



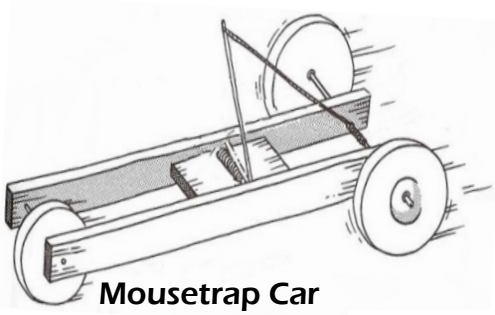
2019 2020

SECME

Diversity in STEM Education

STEM CHAMPIONS

2019-2020 National Student Competition Guidelines



Mousetrap Car

New Game ....

New Game ....