

2022-2023
SECME National Engineering Design Student
Competition

Judging Evaluation Forms



Middle/High School Division



**SECME National Engineering Design Student
Competition
Judging Evaluation Forms
Middle/High School Division**

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Technical Report Evaluation Instructions (MTC/WBR)

Middle/High School Division

As a part of the SECME National Student Engineering Design Competition, the SECME student(s)/student team(s) is required to write a Technical Report describing the design, construction, and operation of the Mousetrap Car or Water Bottle Rocket. The main body of the report should be a maximum of two pages.

EVIDENCE OF PLAGIARISM OR RE-SUBMISSION OF PREVIOUS YEARS' REPORTS WILL RESULT IN A ZERO SCORE.

Structure

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

Content

Table of Contents

- Indicate page numbers where each part of the report can be located.
- Maximum one page.

Abstract

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

Introduction

- 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

- Discuss the thoughts, design ideas, and experimental process by which you designed your vehicle.



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- Reference the data tables from the appendix to defend the conclusions which caused you to change your design (Water Bottle Rocket only).

Construction Procedure

- List materials and tools utilized to construct the vehicle.
- 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 to replicate the SECME Team's MTC or WBR design?

Operation

- Explain the actions necessary to prepare the vehicle to operate and what 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.

Handwritten calculations using the performance equation

- If water bottle rocket, see the calculation manuals: [Grades 6-8](#) [Grades 9-12](#)
- Equations and constants used to design your rocket or mousetrap car

Conclusion/Recommendations

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

Appendix

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

Mechanics

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

NOTE: Unsubmitted Technical Reports will receive a zero score.



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**Written Report Judge's Evaluation Form (MTC/WBR)
Middle/High School Division – PAGE 1/2**

Please check the division: Middle School ☐ High School ☐

| | | | |
|---------------------------------|--|--|--|
| Official School Name | | | |
| Official School District | | State | |
| Competition Event | Mousetrap Car <input type="checkbox"/> | Water Bottle Rocket <input type="checkbox"/> | |
| SECME Team 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 pt.) _____/1
- Double-spaced Text (0 – 1 pts) _____/1
- Report is neat (0 – 1 pts) _____/1
- Pages are numbered and in order (0 – 1 pt.) _____/1

STRUCTURE TOTAL (maximum 10 pts)

_____/10

CONTENT (0 – 80 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 - 15 pts) _____/15
- Calculations (0 – 15 pts) _____/15
- Conclusions and Recommendations (0 - 10 pts) _____/10
- Appendix (0 - 1 pts) _____/1

CONTENT TOTAL (maximum 80 pts)

_____/80



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Written Report Judge's Evaluation Form (MTC/WBR)
Middle/High School Division – PAGE 2/2

MECHANICS, SPELLING & GRAMMAR (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, SPELLING & GRAMMAR TOTAL (*maximum 20 pts*) _____/20

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

SECME Materials List & receipts were included in Technical Report NO YES

TOTAL COST \$ _____

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



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Mousetrap Car Judging

Construction and Operation Judge's Evaluation Form (MTC) – In Person
Middle/High School Division – For Local, District, State, and Regional competitions.

Please check the division: 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 | |

Calculation Formulas

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

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

| | |
|--------------------------------------|--------|
| w, weight of passenger | 82.7 g |
| W, weight of completed car | g |
| L, Length | cm |
| C, Cost | \$ |
| C _H , Highest Cost | \$2.50 |
| D ₁ , Distance | cm |
| T ₁ , Time | s |
| P ₁ , Performance | |
| D ₂ , Distance | cm |
| T ₂ , Time | s |
| P ₂ , Performance | |
| P _H , Highest Performance | |

| | |
|---|--|
| Technical Report (<u>max 100 pts</u>) | |
| Technical Drawing (<u>max 100 pts</u>) | |
| PowerPoint (<u>max 100 pts</u>) | |
| The Art of Engineering* (<u>max 100 pts</u>) | |
| Best Performance Run, F (<u>max 100 pts</u>) | |

Mousetrap Car Performance Point Score:

Final Score = Performance (20%) + PowerPoint(20%) + Drawing(20%) + Report(20%) + AOE*(20%)

Final Score = _____

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

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



**SECME National Engineering Design Student
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**Construction and Operation Judge's Evaluation Form (MTC) – Virtual
Middle/High School Division – For SECME National or any virtual competitions.**

Please check the division: 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 | |

Calculation Formulas

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

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

Middle School Division

| | |
|--------------------------------------|---------------|
| L, Length | cm |
| C, Cost | \$ |
| C _H , Highest Cost | \$2.50 |
| D ₁ , Distance | 500 cm |
| T ₁ , Time | 60 s |
| P ₁ , Performance | |
| P _H , Highest Performance | |

High School Division

| | |
|--------------------------------------|----------------|
| L, Length | cm |
| C, Cost | \$ |
| C _H , Highest Cost | \$2.50 |
| D ₁ , Distance | 1000 cm |
| T ₁ , Time | 60 s |
| P ₁ , Performance | |
| P _H , Highest Performance | |

| | |
|--|--|
| Technical Report (<i>max 100 pts</i>) | |
| Technical Drawing (<i>max 100 pts</i>) | |
| PowerPoint (<i>max 100 pts</i>) | |
| The Art of Engineering* (<i>max 100 pts</i>) | |
| Best Performance Run, F (<i>max 100 pts</i>) | |

Mousetrap Car Performance Point Score:

$$\text{Final Score} = \text{Performance} (20\%) + \text{PowerPoint} (20\%) + \text{Drawing} (20\%) + \text{Report} (20\%) + \text{AOE}^* (20\%)$$

Final Score = _____

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

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



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VEX V5 Robotics Engineering Notebook Evaluation Instructions

One of the VEX V5 Robotics Competition's main missions is to help SECME student teams acquire real-world life skills to benefit them in their academic and professional future. The engineering notebook is a way for student teams to document the engineering design process during the VEX V5 Robotics Competition. The engineering notebook gives student teams the practice of essential life skills, including project management, time management, brainstorming, and teamwork. The engineering notebook reflects the documentation of the student team's design decisions and efforts in creating a novel and innovative competitive robot. SECME student teams should start their engineering notebooks early and update them often and daily. Write handwritten notes and documentation neatly and clearly for judges to read without difficulty.

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, improve their designs, and continue the process until a solution has been produced. During this process, students will come across obstacles, encounter successes and failures, and learn many lessons. It is this process that students should document in their Engineering Notebook.

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

Requirements

1. Cover page
 - a. Title of the Engineering Notebook – (Example: SECME Engineering Design Competition: VEX V5 Robotics Engineering Notebook)
 - b. SECME Team Name
 - c. Each SECME student team member's name, grade
 - d. Official School System/District Name
 - e. SECME team's official school name, city, state, and zip
 - f. SECME School Coordinator's (or Teacher's) name and email
2. Table of Contents
3. Provide a brief description of each SECME team member and their strengths and benefits
4. Design ideas
 - a. Sketched and Photographs
5. SECME Team meeting notes (daily entries)
6. Construction of the robot
7. Operation
 - a. Describe how the robot has been designed to achieve the object of the VEX V5 Robotics game and general novel features
8. Problems encountered and methods to resolve them
9. Conclusion/Future Recommendations
10. Reproducible Project Design



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**Engineering Notebook Judge's Evaluation Form (VEX V5 Robotics)
Middle/High School Division – For SECME National or any virtual competitions.**

Please check the division: 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 | |

The engineering notebook should be written clearly and concisely and exhibit the complete documentation and illustration of the team's design, construction, and testing processes for their robot to achieve the object of the VEX V5 Robotics game.

EVALUATION CATEGORIES

POINTS

Layout (0 – 25 pts)

_____/25

Is the engineering notebook organization easily understood?

Has all required components – Cover page, TOC, Team Description, Design Ideas, Meeting Notes, Construction, Operation, Problems, Conclusions and Recommendations

Documentation (0 – 15 pts)

_____/15

The team regularly demonstrates and illustrates frequent updates (ex., once a week, biweekly, and monthly) documenting the entire team's work.

Design Process (0 – 40 pts)

_____/40

The team shows evidence of a trial-and-error design process that highlights the various phases and development of the team's robot. This includes: Design Ideas, Construction, Operation, Problems, and Conclusion and Recommendations

Sketches/Photographs (0 - 10 pts)

_____/10

Does the engineering notebook include sketches/photographs?

Replicate (0 – 10 pts)

_____/10

Can the engineering notebook be used to replicate the team's robot?

TOTAL (The highest possible score is 100 pts)

_____/100

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



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Water Bottle Rocket Judging

Construction and Operation Judge's Evaluation Form (WBR) – In Person
Middle/High School Division – For Local, District, State, and Regional competitions.

Please check the division: Middle School ☐ High School ☐

| | | | |
|---|--|-------|--|
| Official School Name | | | |
| Official School District | | State | |
| SECME Team 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:

Hangtime (s)

JUDGE #1 NAME: _____
 JUDGE #2 NAME: _____
 JUDGE #3 NAME: _____
 AVERAGE HANGTIME (s): _____

FINAL SCORE CONSTRUCTION AND OPERATION: $\frac{\text{Average SECME team Hangtime (s)}}{\text{Maximum Hangtime (s)}} \times 100\% = \underline{\hspace{2cm}}$

$\frac{\text{Average SECME team Hangtime (s)}}{\text{Maximum Hangtime (s)}} \times 100\% = \underline{\hspace{2cm}}$

FINAL SCORE: Final Score = Hangtime Score(0.20) + Technical Report(0.20) +
 +Technical Drawing(0.15) + Patch Design(0.15) + PowerPoint(0.15) + AOE(0.15)

Final Score = _____

NOTE: The maximum final elementary Water Bottle Rocket score is **100 pts.**

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



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**Construction and Operation Judge's Evaluation Form (WBR) - Virtual
Middle/High School Division – For SECME National or any virtual competitions.**

Please check the division: Middle School ☐ High School ☐

| | | | |
|---|--|-------|--|
| Official School Name | | | |
| Official School District | | State | |
| SECME Rocket Team 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 | <input type="checkbox"/> | No | <input type="checkbox"/> |
| Fin Width Distance (from pressure vessel): (maximum 10 cm) | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| Nose Cone Tip Radius: (minimum 1.5 cm) | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| Throat Exit Clearance: (minimum 7.5 cm) | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |

FINAL SCORE: Final Score = Technical Report(0.20) + Technical Drawing(0.20) + Patch Design(0.20) + PowerPoint(0.20) + AOE(0.20)

Final Score = _____

NOTE: The maximum final elementary Water Bottle Rocket score is 100 pts.

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

Patch Design Challenge Judge's Evaluation Instructions (WBR)

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: Inappropriate patch designs will be removed from the competition. The SECME team will receive a score of zero for patch design.

The Patch Design will be judged on the following criteria:

1. Paper Size Requirement (13" × 13" poster board)
2. SECME Theme: your school or ISL mascot or school motto.
3. Appearance
4. Creativity
5. Explanation of Patch



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**Patch Design Challenge (WBR) – Judge’s Evaluation Form
Middle/High School Division**

Please check the division: Middle School ☐ High School ☐

| | | | |
|---|--|--------------|--|
| Official School Name | | | |
| Official School District | | State | |
| SECME Team 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

Paper Size Requirement (0 – 5 pts) /5

The correct patch size is 13" × 13".

SECME Theme (0 – 20 pts) /20

Incorporation of competition theme: your school or ISL mascot or school motto and team name

Appearance (0 – 20 pts) /20

Attractiveness and neatness of the patch

Creativity (0 – 25 pts) /25

The uniqueness of the information depicted

Explantation of patch design (0 – 30 pts) /30

A description on the back of the patch that explains each part or idea

Total (maximum 100 pts) /100

Judge’s Comments (please use the back page for additional space.)



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The Art of Engineering Judge's Evaluation Instructions

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

AOE is an opportunity for SECME student teams to showcase and discuss the design approach used for their car, rocket, or robot. **The AOE competition only takes place at National Competition Finals.**

New! The AOE video presentation is a virtual only competition.

1. This video presentation showcases the **ART** in the SECME student team engineering design of their car, rocket, or robot.
2. Each SECME student team will submit a five to seven-minute video on their car, rocket, or robot from a creative, innovative, and artistic perspective.

In the video, teams will:

- Introduce their team and themselves
- Introduce their final design
- Walk through their design process
 - Brainstorming design ideas – initial sketches and ideas
 - Prototype Versions – at least two versions
 - What each prototype looked like (image or drawing)
 - What changes were made from each version
 - Final Design
 - Technical drawing and image
 - What changes were made from the last prototype
 - Why this design is your final design

Every student team member must contribute to a piece of the video to get all possible points. Be interactive and engaging in your presentation.

Dress Code. The Art of Engineering showcase's required



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**The Art of Engineering Judge's Evaluation Form
Middle/High School Division**

Please check the division: Middle School ☐ High School ☐

| | | | |
|---------------------------------------|--|--------------|--|
| Official School Name | | | |
| Official School District | | State | |
| Please check Competition Event | Mousetrap Car <input type="checkbox"/> VEX V5 Robotics <input type="checkbox"/> Water Bottle Rocket <input type="checkbox"/> | | |
| 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 |
| Creative and Innovative (0 – 30 pts) | <u> </u> /30 |
| Is the design of the vehicle creative and innovative? | |
| Five to seven-minute Video Presentation (0 -40 pts) | <u> </u> /40 |
| Each student member contributes to the pitch. | |
| The team sold its car or robot design and capabilities. | |
| Judge's overall experience and interaction with the SECME team | |
| Design Process (0 -30 pts) | <u> </u> /30 |
| Presentation details the design process of the build | |
| Brainstormed Initial Designs, 2 Prototype Designs (min), Final Designs | |
| Technical Drawings and Construction Images | |
| Total Score (maximum 100 pts) | <u> </u> /100 |

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



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Essay/Vision Board Judge's Evaluation Instructions

SECME's essay and vision board competitions are written and illustrative representations of the of the topics below. **Essays can be written around Topics 1-4. All vision boards are created around Topic 1.** All essay/vision board submissions will require a cover page.

- Grades 6-12 - students can choose any topic for the essay portion of the competition. Students will create vision boards around Topic 1.

Topics

1. How has participation in SECME helped you to discover my STEM dream job?
2. How has the COVID-19 pandemic shown the importance of STEM?
3. Environmental issues
 - a. Forest Fires
 - b. Global Warming
4. How is Artificial Intelligence (AI) beneficial to technology? What are the limitations of AI technologies in STEM fields?

Topics are open to all grade levels; however, some topics may require more critical thinking, explanations, and details, depending on the grade level.

Competition Requirements

Follow all instructions. Each essay and vision board entry must be prepared and submitted by an individual SECME student.

When choosing topics 2-4, answer the questions:

- A. How does or how should STEM impact these global or environmental issues?
- B. How do you see yourself contributing to the solution to these global or environmental issues?
We encourage you to use your imagination.
- C. How do you see yourself contributing to the use of AI technologies in STEM fields?

The vision board can be hand drawn or created using a computer program. For boards created by hand, teams can use materials such as magazine clippings, newspaper clippings, crayons, markers, colored pencils, colored pens, or paint. Clip art or electronic visual graphics are allowed when designing on a computer. Your vision board must be one page, and it can either be positioned in portrait or landscape.

Grades 6 – 12

Choose a topic from the topic list (1-4) to write your essay.

Using Topic 1, Create your vision board. Write a paragraph or two describing your vision board.

Writing is critical, but it is a learned skill, and some students perfect it sooner than others. As an optional addition to writing, you may record a four-minute video explaining your vision board!

Submission of the essay/vision board must include the following:

1. Required cover page
2. The essay should contain: Middle School: 1,000 – 1,500 words, High School: 1,500-2,500 words
3. Write a one-paragraph description of your vision board (note that your description should be included in your essay, not on the vision board page)
4. Vision Board drawing is one page in length and can be positioned either in portrait or landscape
5. Four-minute (max) video explaining your vision board (optional)



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Grades 6-12 – Topic 1: You will use the essay to embark on a personal exploration to research, plan, and deliver a well-written essay and compose artwork that reflects what you have searched and discovered in the identifying a career path in **S**cience, **T**echnology, **E**ngineering and **M**athematics. **Helpful Tips:** Have a willingness to discover, have access to the Internet, use a Journal to write down all the information you find.



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**SECME Essay/Vision Board Judge's Evaluation Form-Grades 6-12
Middle/High School Division**

Please check the division: Middle School ☐ High School ☐

| | | | |
|---------------------------------|--|--------------|--|
| Official School Name | | | |
| Official School District | | State | |
| Student Name | | Grade | |
| Topics 1-4 | 1. How has participation in SECME helped you to discover my STEM dream job? 2. How has the COVID-19 pandemic shown the importance of STEM? 3. Environmental issues a. Forest Fires b. Global Warming 4. How is Artificial Intelligence (AI) beneficial to technology? What are the limitations of AI technologies in STEM fields? | | |
| Judge's Name | | Date | |

ESSAY ORGANIZATION

POINTS

Includes required cover page, essay, vision board, and vision board explanation. The essay is double-spaced, with 1"-inch margins, and in an approved 12-point font. The essay includes an introduction, body, conclusion, and bibliography

TOTAL ORGANIZATION (0 - 5 pts) _____ **/5**

TOPIC 1: SECME EXPERIENCE

The writer explains how their SECME experience will help prepare them for a STEM career. _____ **/25**

The writer identifies how their SECME experience is the spark for their interest in STEM. _____ **/20**

The writer explains the STEM discipline or activity that captures their interest _____ **/20**

TOPIC 1 TOTAL (0 - 70 pts) _____ **/70**

TOPICS 2-4 CONTENT AND FOCUS

Does the writer demonstrate a credible argument on the importance of STEM? _____ **/35**

Does the content align with the topic chosen for the essay? _____ **/35**

TOPICS 2-4 TOTAL (0 – 70 pts) _____ **/70**



**SECME National Engineering Design Student
Competition
Judging Evaluation Forms
Middle/High School Division**

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 and convincing.

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/verb agreement, sentence fragments, run-ons, etc.)

Writing is free of (age-appropriate) spelling errors

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

TOTAL ESSAY/PICTURE BOOK (0 - 100 pts) _____ **/100**

VISION BOARD AND EXPLANATION

Appearance/Effort (0 - 30 pts) _____ **/30**

Creativity/Originality (0 - 30 pts) _____ **/30**

Explanation of vision board (0 - 40 pts) _____ **/40**

TOTAL VISION BOARD (0 - 100 pts) _____ **/100**

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

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



**SECME National Engineering Design Student
Competition
Judging Evaluation Forms
Middle/High School Division**

PowerPoint Presentation Judge's Evaluation Instructions

**Mousetrap Car, VEX V5 Robotics, and Water Bottle Rocket
Middle/High School Division**

All Mousetrap Car, Water Bottle Rocket, and VEX V5 Robotics teams that advance to the SECME National Student Competition Finals are required to submit a PowerPoint presentation.

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 SECME team members.
2. Approach to Design Challenge
 - In this research step, you will explore the different vehicle builds and/or showcase the different design prototypes you have developed to create solutions for the 2022-2023 design requirements.
3. Construction & Operation
 - Discuss the design your team has chosen. Give us the highlights of your vehicle, for example, your vehicle's capabilities or figures, what is innovative about your car design, and how your vehicle works? In other words, how does your vehicle operate and specifically?
4. Materials & Cost (Mousetrap Car and Water Bottle Rocket)
 - This section lists all materials used to construct your vehicle and the cost of each material used. Remember, your recycled materials have zero cost, and the maximum budget is \$2.50
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 current design vehicle or create a different vehicle design.

EVIDENCE OF PLAGIARISM OR RE-SUBMISSION OF PREVIOUS YEARS' PRESENTATION WILL RESULT IN ZERO SCORE.



**SECME National Engineering Design Student
Competition
Judging Evaluation Forms
Middle/High School Division**

PowerPoint Judge's Evaluation Form

**Mousetrap Car and Water Bottle Rocket PowerPoint Judge's Evaluation Form
Middle/High School Division**

Please check the division: Middle School ☐ High School ☐

| | | | |
|--------------------------------|--|-------|--|
| Official School Name | | | |
| Official School District | | State | |
| Please check Competition Event | Mousetrap Car <input type="checkbox"/> Water Bottle Rocket <input type="checkbox"/> | | |
| 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

Introduction of SECME student team (0 – 5 pts)

 /5

- SECME student teammates and coordinator introduction.
- Explain the contribution of all the SECME student teammates.

Approach to Design Challenge (0 -25 pts)

 /25

- Clearly shows research alternative designs/prototypes for vehicle.

Material & Cost (0 – 20 pts)

 /20

- Document all materials used and all costs related to the materials used for the construction of the vehicle.
- The vehicle is within a \$2.50 budget.

Construction & Operation (0 -25 pts)

 /25

- A clear description of the design of the vehicle.
- A clear description of how the vehicle operates.

Conclusion & Recommendations (0 -25 pts)

 /25

- Clearly states all major findings from the competing vehicle.
- Clear explanation of any improvements for current design or an alternative design vehicle.

TOTAL SCORE (0 - 100 pts)

 /100



**SECME National Engineering Design Student
Competition
Judging Evaluation Forms
Middle/High School Division**

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



**SECME National Engineering Design Student
Competition
Judging Evaluation Forms
Middle/High School Division**

**VEX V5 Robotics PowerPoint Judge's Evaluation Form
Middle/High School Division**

Please check the 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

Introduction of SECME student team (0 – 10 pts)

 /10

- SECME student teammates and coordinator introduction.
- Explain the contribution of all the SECME student teammates.

Approach to Design Challenge (0 -30 pts)

 /30

- Clearly shows research alternative designs/prototypes for vehicle.

Construction & Operation (0 -30 pts)

 /30

- A clear description of the design of the vehicle.
- A clear description of how the vehicle operates.

Conclusion & Recommendations (0 -30 pts)

 /30

- Clearly states all major findings from the competing vehicle.
- Clear explanation of any improvements for current design or an alternative design vehicle.

TOTAL SCORE (0 - 100 pts)

 /100

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

Technical Drawing Judge's Evaluation Instructions

Mousetrap Car, VEX V5 Robotics, and Water Bottle Rocket

Middle/High School Division

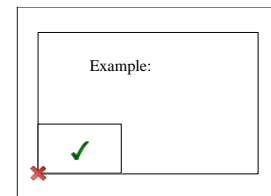
As part of the Engineering Design Competition, each team must prepare a scaled drawing depicting the vehicle they have designed and built.

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. 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 team's actual vehicle (photographs and computer-generated drawings will **NOT** be allowed).
4. All dimensions are required to be illustrated in 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 the 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



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 the vehicle's views (front, side, and top views)** 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

*Engineering paper requirements. The 2022-2023 SECME National Competition will be a virtual event. The engineering paper weight (16-pound vellum will not be a consideration)



**SECME National Engineering Design Student
Competition
Judging Evaluation Forms
Middle/High School Division**

Technical Drawing Judge's Evaluation Form

**Technical Drawing Judge's Evaluation Form – In Person
Middle/High School Division**

Please check the division: Middle School ☐ High School ☐

| | | | |
|---------------------------------------|--|--------------|--|
| Official School Name | | | |
| Official School District | | State | |
| Please check Competition Event | Mousetrap Car <input type="checkbox"/> VEX V5 Robotics <input type="checkbox"/> Water Bottle Rocket <input type="checkbox"/> | | |
| 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 (0 - 10 pts) | _____/10 |
| EVALUATION CATEGORIES (0 – 90 PTS) | POINTS |
| Resemblance: (0 – 30 pts) | _____/30 |
| • The accuracy to which the vehicle drawing illustrates the actual vehicle designed and built by the team. | |
| Scale (0 – 20 pts) | _____/20 |
| • The proportions in the drawing correctly relate to and represent the team's actual vehicle. | |
| Naming and Labeling (0 -20 pts) | _____/20 |
| • The correctness of the names/labels of all of the parts in the drawing of the vehicle. | |
| Appearance and Neatness (0 -20 pts) | _____/20 |
| • The quality of the visual presentation of the vehicle drawing. | |
| TOTAL EVALUATION (0 - 90 pts) | _____/90 |
| TOTAL SCORE (0 - 100 pts) | _____/100 |

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



**SECME National Engineering Design Student
Competition
Judging Evaluation Forms
Middle/High School Division**

**Technical Drawing Judge's Evaluation Form – Virtual
Middle/High School Division**

Please check the division: Middle School ☐ High School ☐

| | | | |
|---------------------------------------|--|--------------|--|
| Official School Name | | | |
| Official School District | | State | |
| Please check Competition Event | Mousetrap Car <input type="checkbox"/> VEX V5 Robotics <input type="checkbox"/> Water Bottle Rocket <input type="checkbox"/> | | |
| 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 |
| • Title and legend (located correctly on drawing) | _____ /6 |

TOTAL ENGINEERING PAPER REQUIREMENTS (0 - 10 pts) _____ /10

| | |
|---|---------------|
| EVALUATION CATEGORIES (0 – 90 PTS) | POINTS |
| Resemblance: (0 – 30 pts) | _____ /30 |

- The accuracy to which the vehicle drawing illustrates the actual vehicle designed and built by the team.

Scale (0 – 20 pts) _____ /20

- The proportions in the drawing correctly relate to and represent the team's actual vehicle.

Naming and Labeling (0 -20 pts) _____ /20

- The correctness of the names/labels of all of the parts in the drawing of the vehicle.

Appearance and Neatness (0 -20 pts) _____ /20

- The quality of the visual presentation of the vehicle drawing.

TOTAL EVALUATION (0 - 90 pts) _____ /90

TOTAL SCORE (0 - 100 pts) _____ /100



**SECME National Engineering Design Student
Competition
Judging Evaluation Forms
Middle/High School Division**

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