MEDICAL TECHNOLOGY

OVERVIEW

Applying leadership and 21st century skills, participants conduct research on a contemporary medical technology issue, related to the current year's theme, noted on the TSA website under *Themes & Problems,* document their research and solution, and present their documentation through a static display. The entry may include student research, or a re-creation or simulation of research performed by the scientific community. A student-designed model or prototype depicting an aspect of the issue will also be included in addition to the display. Semifinalist teams participate in an on-site presentation/interview.

ELIGIBILITY

Three (3) teams per state may participate.

TIME LIMITS

Ten (10) minutes are allowed for the semifinal presentation and interview broken down as follows:

A. One (1) minute for set-up

B. Seven (7) minutes for the presentation

C. Two (2) minutes to respond to questions from judges

ATTIRE

TSA competition attire is required.

PROCEDURE

PRE-CONFERENCE

A. Participants access the annual theme posted on the TSA website under *Themes & Problems*.

B. Participants research the issue using credible sources.

C. Participants prepare their display and model/prototype according to the regulations.

PRELIMINARY ROUND

A. No more than two (2) team representatives report at the time and place stated in the conference program to check in the display and the model/prototype.

B. Entries are evaluated by the judges with neither students nor advisors present based on the following criteria:

　1. Judges score the static display criteria to determine the top twenty-four (24) preliminary contestants, which will not be posted.

　2. Judges score the Documentation Portfolio criteria of those top twenty-four (24) contestants to determine the top twelve (12) semifinalists.

C. A list of twelve (12) semifinalist teams (in random order) is posted.

SEMIFINAL ROUND

A. One (1) team representative reports at the time and place stated in the conference program to sign-up for a presentation time.

B. Three (3) team representatives report at least ten (10) minutes prior to their assigned time to the designated place for their presentation.

C. Semifinalist team representatives participate in the on-site presentation and interview.

D. Team representatives pick-up their entry from the display area at the time and place stated in the conference program.

E. The top ten (10) finalists are announced at the awards ceremony.

REGULATIONS AND REQUIREMENTS

Students will work to develop their leadership and 21st century skills in the process of preparing for and participating in this TSA competitive event. The development and application of those skills must be evident in their submission, demonstration, and/or communication pertaining to the entry.

PRE-CONFERENCE

A. Students must understand the fundamental concepts and principles of the contemporary medical technology issue they research. Research about the issue should focus on significant impacts (opportunities and risks) on the environment, economy, and society, as well as any important ethical considerations.

B. Display Guidelines:

1. The size of the display may not exceed 15" deep x 3' wide x 4' high.

2. Supporting materials, such as research, references, and resources, should be exhibited in a creative and effective manner on a stand-alone display and should include at a minimum:

   a. Team identification number

   b. Summary of the issue researched

   c. Societal impact, including economic, social, environmental, and ethical considerations

   d. Supporting information such as logs, graphs, sketches, drawings, illustrations, and photographs

   e. Photographic verification: Photographic or digital images clearly displaying the design and creation of the model/prototype.

   f. The display must incorporate the use of design principles. Participants highlight the display with creative visual elements (e.g., photos, titles) to actively engage the audience. Participants may use images "labeled for "re-use," but must properly cite the source (refer to the TSA Membership System/Total TSA/Competition Forms and Resources).

   g. Copyright: Citation of all ideas, fonts, and images from sources other than the designer, and/or that are copyrighted (most fonts and images found on the web are copyrighted material unless purchased or offered as free-domain) and MUST be included on the back of the display. Clip art must be documented.

   h. Written permission for all copyrighted material must be included on the back of the display (see Forms Appendix).

   i. Photo/Film/Video Consent and Release Forms. If the entry contains images of people (minors require parental consent), proof of consent must be included for each person and included on the back of the display (see Forms Appendix).

3. A/C electricity may not be used.

4. If the display and/or model/prototype requires power, they must be powered by dry-cell batteries or photo-voltaic cells.

   a. The power supply must physically fit within the display dimensions.

   b. All power must be switched off once the team has completed set-up.

   c. If teams want judges to activate any electronic device in their model/prototype/display, complete instructions must be provided to judges on how to power up the model/display.

C. Model/Prototype

1. Participants must create a model or prototype of the medical technology solution chosen

2. Models/prototypes may use additive and/or subtractive manufacturing of any traditional, Computer Numerical Control (CNC), 3D printing, or laser technology available to the participant

3. Models/prototypes may not be commercially purchased or obtained from a medical facility or other retail supplier

4. A/C electricity may not be used

5. Any power source used must fit within the maximum display area

6. Dry cell or photo-voltaic cells may be used for power, if desired

7. Photographic verification of the design and creation of the model or prototype must be included as part of the display.

8. If operating instructions are necessary (including electronics), they must be clearly displayed.

D. Once the display set-up time frame has closed, participants may not re-enter the event area.

E. Violation of the following will result in disqualification:

1. No viruses, live plants, or animals may be used as a part of the display

2. No harmful or illegal substances may be displayed.

SEMIFINAL ROUND

A. The presentation is limited to three (3) team representatives. Each member should be an active participant in the presentation.

B. Representatives may reference their display and documentation during the presentation and interview.

C. Teams may bring and use audio/visual materials or a laptop for their presentation. Projectors and screens are not permitted.

D. Time limits:

1. One (1) minute for set-up

2. Seven (7) minutes for presentation

3. Two (2) minutes to respond to questions from judges

4. A five-(5) point deduction will be incurred for any time infraction.

EVALUATION

PRELIMINARY ROUND

Tier 1

A. The display

Tier 2

B. The model/prototype

SEMIFINAL ROUND

A. The presentation/interview

Refer to the official rating form for more information.

STEM INTEGRATION

This event has connections to the STEM areas of Science, Technology, Engineering, and Mathematics.

LEADERSHIP AND 21ST CENTURY SKILLS DEVELOPMENT

This event provides opportunity for students to build and develop leadership and 21st century skills including but not limited to:

- Communication
- Collaboration/Social Skills
- Initiative
- Problem Solving/Risk Taking
- Critical Thinking
- Perseverance/Grit
- Creativity
- Relationship Building/Teamwork
- Dependability/Integrity
- Flexibility/Adaptability

CAREERS RELATED TO THIS EVENT

This competition has connections to one (1) or more of the careers below:

- Dietitian
- Doctor
- Medical technologist
- Nurse
- Pharmacist
- Prosthetics practitioner

MEDICAL TECHNOLOGY

2024 & 2025 OFFICIAL RATING FORM

MIDDLE SCHOOL

Judges: Using minimal (1-4 points), adequate (5-8 points), or exemplary (9-10 points) performance levels as a guideline in the rating form, record the scores earned for the event criteria in the column spaces to the right. The X1 or X2 notation in the criteria column is a multiplier factor for determining the points earned. (Example: an "adequate" score of 7 for an X1 criterion = 7 points; an "adequate" score of 7 for an X2 criterion = 14 points.) A score of zero (0) is acceptable if the minimal performance for any criterion is not met.

Go/No Go Specifications

- Before judging the entry, ensure that the items below are present; indicate presence with a check mark in the box.
- If an item is missing, leave the box next to the item blank and place a check mark in the box labeled ENTRY NOT EVALUATED.
- If a check mark is placed in the ENTRY NOT EVALUATED box, the entry is not to be judged.

☐ TIER 1 – Display is present
☐ TIER 2 – Model/prototype is present
☐ ENTRY NOT EVALUATED

TIER 1 – DISPLAY (80 points)

Record scores in the column spaces below.

CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
Explanation of Impacts (X2)	Explanation is missing a discussion of the issue's relevance to environmental, economic, social, and/or ethical considerations.	Explanation addresses some of the issue's relevance to environmental, economic, social, and/or ethical considerations.	Explanation includes a full discussion of the issue's relevance to environmental, economic, social, and/or ethical considerations.	
Supporting Information (X1)	Supporting information does not help to clarify the issue and/or it is of little significance to the issue.	Supporting information is somewhat appropriate and helps provide some clarity to the issue.	Supporting information is highly effective and of excellent quality.	
Research, References, and Resources (X1)	Research is inadequate, and/or very few credible sources are referenced.	Research is conducted appropriately, with some adequate credible sources.	A comprehensive research base that includes credible sources is evident.	
Communication of Issue (X1)	It is difficult to understand the issue being communicated; an illogical explanation is presented.	The issue is communicated and thoughts are somewhat organized.	The issue is communicated in an organized, clear, and concise manner.	
Communication of Solution (X1)	It is difficult to understand the solution being communicated; an illogical explanation is presented.	The solution is communicated and thoughts are somewhat organized.	The solution is communicated in an organized, clear, and concise manner.	
Creativity (X1)	The display lacks creativity; no, or very few, design principles are integrated in the display.	Some elements of creativity exist in the display, and essential design principles are generally evident.	The display exudes creativity; essential design principles and elements are well integrated.	
Aesthetics and Artisanship (X1)	Work is unorganized and sloppy; display seems to be an afterthought or thrown together.	Display generally depicts the issue.	Display is exemplary in logically communicating the issue.	
TIER 1 – DISPLAY SUBTOTAL (80 points)				

TIER 2 – MODEL/PROTOTYPE (40 points)

CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
Model/Prototype (X1)	Model/prototype is present but not complete, or is lacking in overall quality.	Model/prototype is present and is good quality but missing detail to adequately portray the project's focus.	Exemplary model/prototype is present and shows great detail in portraying the project's focus.	
Communication of Solution (X1)	It is difficult to understand the solution being communicated; an illogical explanation is presented.	The solution is communicated and thoughts are somewhat organized.	The solution is communicated in an organized, clear, and concise manner.	
Creativity (X1)	The model/prototype lacks creativity; no, or very few, design principles are evident.	Some elements of creativity exist in the model/prototype, and essential design principles are generally evident.	The model/prototype exudes creativity; essential design principles and elements are well integrated.	
Aesthetics and Artisanship (X1)	Work is unorganized and sloppy; model/prototype seems to be an afterthought or thrown together.	Model/prototype depicts a generally organized conceptualization of the issue.	Model/prototype is exemplary in logically communicating the issue.	
TIER 2 – MODEL/PROTOTYPE SUBTOTAL (40 points)				

Rules violations (a deduction of 20% of the total possible points for the above sections) must be initialed by the judge, coordinator, and manager of the event. Record the deduction in the space to the right.

Indicate the rule violated: _____

PRELIMINARY SUBTOTAL (120 points)

SEMIFINAL PRESENTATION/INTERVIEW (60 points)

CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
Organization (X1)	Participants seem unorganized and unprepared for the presentation, with an illogical explanation of the problem and solution.	Participants are generally prepared for the presentation; explanation of the problem and solution are somewhat communicated and organized.	The presentation is logical, well-organized, and easy to follow; the problem and solution are communicated in an organized and concise manner.	
Knowledge (X2)	Participants seem to have little understanding of the concepts in their project; answers to questions may be vague.	Participants exhibit a basic understanding of the concepts in their project.	Participants show clear evidence of a thorough understanding of the project.	
Articulation (X1)	Communication of the solution is unclear, unorganized, and/or illogical; leadership and/or 21st century skills are not evident.	Communication of the solution is somewhat logical and clear; leadership and/or 21st century skills are somewhat evident.	Communication of the solution is clear, concise, and logical; leadership and/or 21st century skills are clearly evident.	
Team Participation (X1)	Majority of the presentation/interview is made by one member of the team; the partners may be disengaged from the presentation.	Team members generally are engaged in the presentation, though one member may take on more responsibility than the other(s).	All team members are actively involved in the presentation/interview; there is shared responsibility among team members.	

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SEMIFINAL/INTERVIEW PRESENTATION (60 points) – continued				
Delivery (X1)	The team is verbose and/or uncertain in its presentation/interview; participants' posture, gestures, and lack of eye contact diminish the presentation.	The team is somewhat well-spoken and clear in its presentation/interview; participants' posture, gestures, and eye contact are acceptable in the presentation.	The team is well-spoken and distinct in its presentation/interview; participants' posture, gestures, and eye contact result in a polished, natural, and effective presentation.	
			SEMIFINAL/INTERVIEW PRESENTATION SUBTOTAL (60 points)	

Rules violations (a deduction of 20% of the total possible points for the above sections) must be initialed by the judge, coordinator, and manager of the event. Record the deduction in the space to the right.

Indicate the rule violated: _____

TIME DEDUCTIONS

A five-(5) point deduction will be incurred for any time infraction.

SEMIFINAL SUBTOTAL (60 points)

To arrive at the TOTAL score, add any subtotals and subtract rules violation points, as necessary. **TOTAL (180 points)**

Comments:

_____

I certify these results to be true and accurate to the best of my knowledge.

JUDGE

Printed name: _____   Signature: _____

MEDICAL TECHNOLOGY
EVENT COORDINATOR INSTRUCTIONS

PERSONNEL

A. Event coordinator, one (1)

B. Judges:

1. Preliminary round, two (2) or more

2. Semifinal round, two (2) or more

C. Assistants for check-in, two (2)

MATERIALS

A. Coordinator's packet, containing:

1. Event guidelines, one (1) for the coordinator and for each judge

2. TSA Event Coordinator Report

3. List of judges/assistants

4. Stick-on labels for identifying entries

5. Results envelope with coordinator forms

B. Display tables for entries

C. Table and chairs for team presentations, as needed

D. Stopwatch

E. Measuring tape

F. Table and chairs for event coordinator and judges

RESPONSIBILITIES

AT THE CONFERENCE

A. Attend the mandatory coordinator's meeting at the designated time and location.

B. Report to the CRC room and check the contents of the coordinator's packet.

C. Review the event guidelines and check to see that enough personnel have been scheduled.

D. Inspect the area(s) in which the event is to be held for appropriate set-up, including room size, chairs, tables, outlets, etc. Notify the event manager of any potential problems.

E. At least one (1) hour before the event is scheduled to begin, meet with judges and assistants to review time limits, procedures, regulations, evaluation, and all other details related to the event. If questions arise that cannot be answered, speak to the event manager before the event begins.

PRELIMINARY ROUND

A. Check in the entries at the time stated in the conference program.

B. No more than two (2) team representatives set up and check in:

1. The display

2. The model/prototype

C. Late entries are considered on a case-by-case basis and only when the lateness is caused by events beyond the participant's control.

D. In order to compete, participants must be on the entry list or must have approval of the CRC.

E. Requirements for attire do NOT apply during check-in, only on the first day of the conference.

F. Each entry must include the team's identification number in the upper right-hand corner of the display and somewhere visible on the model/prototype.

PRELIMINARY ROUND

A. Independently score the display criteria and model/prototype.

B. Judges independently review the entries based on the following criteria:

Tier 1

Judges score the display criteria to determine the top twenty-four (24) preliminary contestants, which will not be posted.

Tier 2

Judges score the model/prototype criteria of those top twenty-four (24) contestants to determine the top twelve (12) semifinalist teams.

C. Decisions about rules violations must be discussed and verified with the judges, event coordinator, and the CRC manager to determine either::

1. To deduct twenty percent (20%) of the total possible points in this round

2. To disqualify the entry

The event coordinator, judges, and CRC manager must initial either of these actions on the rating form.

D. Judges determine the twelve (12) semifinalists and discuss and break any ties.

E. Submit semifinalist results to the CRC room.

F. Create a sign-up sheet for semifinalist presentations/ interviews and communicate any instructions to the semifinalist participants.

G. Manage the pick-up of non-semifinalist entries.

SEMIFINAL ROUND

A. Prepare a list of five to ten (5-10) standard interview questions to be asked of all participants.

B. Semifinalists report to sign-up for the presentation at the time and place stated in the conference program.

C. Check in semifinalists and confirm with the teams their order of presentation and the procedure. Team representatives should report at least ten (10) minutes prior to their assigned time to the designated place for their presentation.

D. Manage the presentations and interviews.

E. If judges ask questions, they should be the same questions for each team for the purpose of comparing one team to another.

F. Discuss rule violations and have all relevant parties initial the rating form.

G. Judges independently assess the semifinal presentation and interview.

H. Judges determine the top ten (10) finalists and discuss and break any ties.

I. Submit the finalist results and all related forms in the results envelope to the CRC room.

J. If necessary, manage security and the removal of materials from the event area.