

ASSISTIVE TECHNOLOGY DESIGN

OVERVIEW

Applying leadership and 21st century skills, participants research, design, and display an assistive technology device or product for a special population within their local community.

ELIGIBILITY

Open to middle school and high school chapters. Three (3) teams of two to six (2-6) members per chapter may participate.

ATTIRE

TSA competition attire is required.

PREPARATION

- A. Participants concentrate their efforts on understanding and researching their chosen special population.
- B. Participants understand the definition, purpose, types, and function of assistive technology:
 - a. Defined as an item, piece of equipment, or system used to increase, maintain, or improve the functional capabilities of individuals with disabilities
 - b. Ranges from low tech to mid tech to high tech devices or equipment
- C. Participants design an assistive technology device or product and documentation according to the regulations.

REGULATIONS AND REQUIREMENTS

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

PRELIMINARY ROUND

- A. The Documentation Portfolio
 - a. Documentation materials (comprising "a portfolio") are required and must be secured in a clear front report cover with the following single-sided, 8 1/2", x 11" pages, in this order:
 - i. Title page with the event title, the conference state, the year, and the team ID number; one (1) page
 - ii. Table of contents; pages as needed
 - iii. Research: Purpose, types, function, and examples of assistive technology; one (1) page
 - iv. Narrative reflection: Interview a chosen special population in your local community and include what you learned, what difficulties this population faces, and why your chosen tool could help this special population within your local community; up to two (2) pages
 - v. Description of the product; up to two (2) pages, including:
 1. Instructions for its use
 2. Overall advantages and usefulness of the device/product
 3. Any safety considerations
 - vi. Drawings: Initial design/brainstorming sketches as well as detailed working drawings of the device/product, complete with dimensions and parts clearly labeled - may be hand drawn or computer drawn; pages as needed
 - vii. Design cycle; pages as needed:

1. Identify the challenge/need
 2. Research possible solutions
 3. Design process and specifications of the device/product
 4. Obstacles you may face while creating a prototype of your device/product
 5. How you would test and evaluate the prototype of the device/product to improve and redesign as needed
- viii. Plan of Work log (See the Forms Appendix on the [TSA website](#))
 - ix. References and Resources in proper Modern Language Association (MLA) style; pages as needed
- B. The Device/Product Design
- a. Can be low tech, mid tech, or high tech
 - b. Solution: The device/product must address the identified special population need
 - c. Appropriate materials: The device/product must use the materials in a manner that adds value to the device/product
 - d. Aesthetics: The device/product must be pleasing to view
 - e. Ergonomics: The device/product must be easy to use
 - f. Creativity: The device/product is an original solution to the identified special population's needs
 - g. The device/product must be no larger than 12" x 12" x 12" for ease of portability
- C. The Display
- a. The total size of the free-standing display may not exceed 15" deep x 3' wide x 4' high
 - b. A tangible prototype/model must be included with the display and must physically fit within the display board dimensions.
- D. Submission
- a. Participants will check in their entry (device/product, portfolio, and display) at the time and place stated in the conference schedule. No more than two (2) team members may set up the display.
- c. The display must include:
 - i. The product name
 - ii. Information regarding the problem to be solved by the product (e.g., target audience, intended use, instructions for use [if necessary], etc.)
 - iii. The impact your device/product could have on your chosen special population in your local community
 - iv. Information and photographic documentation illustrating the various steps of the design process, including field testing and redesign phases, the participants followed in the creation of the product
 - d. If the display and/or prototype/model requires power, they must be powered by dry-cell batteries or photo-voltaic cells.
 - e. The power supply must physically fit within the display board dimensions.
 - f. All power must be switched off once the team has completed set-up.
 - g. If teams want judges to activate any electronic device in their model/display, complete instructions must be provided to judges on how to power up the model/display.
 - h. No harmful or illegal substances are permitted. No viruses, live plants, or animals are permitted. No dangerous processes, experiments, and/or physical models may be displayed/demonstrated.

- b. Submission information will be provided in the Colorado TSA State Competitive Events Guide.
- c. Entries received after the time listed in the conference schedule will not be judged.
- E. Judges score the entries.
- F. Twelve (12) semifinalists are announced.

SEMIFINAL ROUND

- A. The Presentation/Interview
 - a. Participants sign up for an interview time.
 - b. Teams will designate three (3) representatives to the semifinalist portion of the event, in which the representatives will present a two-minute "sales pitch" about their product. During the presentation/interview teams will be expected to use their displays to enhance and explain their proposed solution to the challenge and problem addressed. Each team member is expected to have an equal share in the presentation, and points will be deducted for teams not having a balanced presentation.
 - c. All team members are allotted a maximum of ten (10) minutes to explain their entry and respond to interview questions.
 - d. Participants may refer to the documentation and display during the presentation/interview.
- B. Judges score the presentation/interviews.
- C. The top three (3) finalists are announced.

EVALUATION

PRELIMINARY ROUND

- A. The documentation portfolio
- B. The device/product design
- C. The digital display

SEMIFINAL ROUND

- A. The presentation/interview

Refer to the official rating form for more information.

STEM INTEGRATION

This event aligns with the STEM (Science, Technology, Engineering, and Mathematics) educational standards.

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:

- Applied behavior analyst
- Assistive technology practitioner
- Assistive technology supplier
- Developmental psychologist
- Industrial engineer
- Integrated services teacher
- Manufacturing engineer
- Occupational therapist
- Orthotist/prosthetist
- Physical therapist
- Rehabilitation engineer
- Rehabilitation technologist
- Rehabilitation therapist
- Speech-language pathologists

Participant/Team ID# _____

ASSISTIVE TECHNOLOGY DESIGN	Go/No Go Specifications	
2022 OFFICIAL RATING FORM	<ul style="list-style-type: none"> • Before judging the entry, ensure that the items below are present; indicate presence with a check mark in the box. 	
MIDDLE AND HIGH SCHOOL	<ul style="list-style-type: none"> • 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. 	
<p>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.</p>		<ul style="list-style-type: none"> • If a check mark is placed in the ENTRY NOT EVALUATED box, the entry is not to be judged.
	FALSE	Documentation portfolio was submitted
	FALSE	Display was submitted
	FALSE	ENTRY NOT EVALUATED

DOCUMENTATION PORTFOLIO (70 points)				Record scores in the column spaces below.
CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
Research (X1)	Evidence of research on Assistive Technology is not present or is lacking major information. There are no details.	Evidence of research on Assistive Technology is present. Attention to detail may be lacking.	There is a wealth of evidence of research on Assistive Technology, its purpose, types, function, and examples. Great attention to detail is evident.	
Narrative Reflection (X1)	The narrative is vague. It is unclear whether or not an interview or research was conducted on the effectiveness and impact of the tool.	A narrative is included. The interview was not included, but research on the special population and how the tool is effective is evident. Narrative	A narrative of your interview with your chosen special population in your local community, what you learned, what difficulties this population faces, and why your tool could help this special population within your local community. Narrative is thorough, detailed, and complete.	

		lacks detail or completeness.		
Product Description (X1)	A description is not present or is lacking major information. There are no details. The evaluator is unable to visualize the device/product.	A description is included, but may lack some key elements. Description lacks details, may be vague, or is incomplete. The evaluator has some difficulty visualizing the device/product.	Description of the device/product identifies the problem, contains instructions for its use, describes the overall advantages and usefulness of the device/product, and analyzes potential safety considerations. Description is thorough, detailed, complete, and helps the evaluator visualize the device/product.	
Drawings (X1)	Drawings are incomplete or not included. They contain errors and are low quality.	Initial design/brainstorming sketches or detailed working drawings of the device/product are included, but not both. The drawings may have some errors or are lacking quality.	All required drawings are included and are exemplary in format. Drawings are complete with dimensions and parts clearly labeled. May be hand drawn or computer drawn, but must be high in quality.	
Design Cycle (X1)	There is little, if any, documentation showing how the design cycle was incorporated into the project. Steps lack details.	There is adequate documentation indicating the use of the design cycle in the preparation of the design. Most steps are detailed. Participant does not address obstacles they may face or how they would test and evaluate the device/product.	There is a clear effort made to document these steps of the design cycle: identifying the challenge/need, researching possible solutions, formulating a specification. Details for each step are provided and may include individual assignments and timelines. Participant also includes obstacles they may face while creating a prototype of the device/product and how they would test and evaluate the prototype to improve and redesign as needed.	
Plan of Work Log (X1)	Log is poorly organized and/or is incomplete.	Log is adequately detailed and organized. It contains most of the required components.	Log is well documented and it contains all the required components.	
References and Resources (X1)	A list of tools, software (if any) and resources/references used may not be included or is incomplete and/or MLA format is not used.	A list of tools, software (if any) and resources/references used is included. MLA format is used.	A detailed list of tools, software (if any) and resources/references used is included. MLA format is used.	
DOCUMENTATION PORTFOLIO SUBTOTAL (70 points)				0

DEVICE/PRODUCT DESIGN (60 points)				Record scores in the column spaces below.
CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
Solution (X2)	Device/product does not appropriately address the needs of the identified special population.	Device/product somewhat addresses the needs of the identified special population.	Device/product appropriately addresses the needs of the identified special population.	
Materials (X1)	Device/product does not use the appropriate materials for the solution.	Device/product uses appropriate materials for the solution, but they may not add value to the device/product.	Device/product materials are used in a manner that adds value to the device/product.	
Aesthetics (X1)	Device/product is not pleasing to view.	Device/product is somewhat pleasing to view.	Device/product is pleasing to view.	
Ergonomics (X1)	Device/product is not easy to use.	Device/product is somewhat easy to use.	Device/product is easy to use.	
Creativity (X1)	Device/product lacks uniqueness to address the identified special population's needs.	Device/product is a somewhat unique solution to the identified special population's needs.	Device/product is an original solution to the identified special population's needs.	
DEVICE/PRODUCT DESIGN SUBTOTAL (60 points)				0
DISPLAY (50 points)				Record scores in the column spaces below.
CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
Summary of Needs (X1)	It is difficult to understand the chosen special population's needs in the display; an illogical explanation is presented.	The chosen special population's needs are communicated in the display and thoughts are generally organized and/or concise.	The chosen special population's needs are clearly stated in an organized and concise manner in the display.	
Description of Impact (X2)	It is difficult to understand the impact your device/product being communicated in the	The impact your device/product could have on your chosen	The impact your device/product could have on your chosen special population is clearly stated in an	

	display; an illogical explanation is presented.	special population is communicated in the display, and thoughts are generally organized and/or concise.	organized and concise manner in the display.	
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)	Display is unorganized and sloppy; display seems to be an afterthought or thrown together.	Display is somewhat organized and generally aesthetically pleasing.	Display is logical, organized, cohesive, and aesthetically pleasing.	
DIGITAL DISPLAY SUBTOTAL (50 points)				0

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 (180 points)				0
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SEMIFINAL PRESENTATION/INTERVIEW (50 points)				Record scores in the column spaces below.
CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
Organization (X1)	Team seems unprepared and unorganized for the presentation/ interview, with an illogical explanation of the project.	Team is prepared for the interview and is somewhat organized in its presentation to judges; team's presentation thesis is, for the most part, logical and/or clear.	Team's presentation/interview with judges is well organized; the interview is concise and logical, with a clear explanation of the development of the project.	
Knowledge (X1)	Team members seem to have little understanding of the concepts in their project; vague interview answers are provided.	Team members have a generalized understanding of the concepts discussed and answer questions adequately.	Evidence is clear that team members have a thorough understanding of the concepts discussed; they answer questions thoroughly.	

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.	The interview provides a clear, concise, and easy-to-follow analysis of the solution; leadership and/or 21st century skills are clearly evident.	
Delivery (X1)	The team is verbose and/or uncertain in its presentation/ interview; participants' posture, gestures, and lack of eye contact diminish the delivery.	The team is somewhat well-spoken and clear in its presentation/ interview; participants' posture, gestures, and eye contact result in an acceptable delivery.	The team is well-spoken and distinct in its presentation/interview; participants' posture, gestures, and eye contact result in a polished, natural, and effective delivery.	
Team Participation (X1)	Only one person in the group communicates with judges; there is little or no participation from other team members.	Team members all participate to some extent and seem to understand the concepts.	Team members seem to fully understand the concepts and share an equal role in the interview.	
SEMIFINAL PRESENTATION/INTERVIEW SUBTOTAL (50 points)				0
<p>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.</p> <p>Indicate the rule violated: _____</p>				
SEMIFINAL SUBTOTAL (50 points)				0
To arrive at the TOTAL score, add any subtotals and subtract rules violation points, as necessary. TOTAL (230 points)				0