



Steve Price, Georgia TSA Executive Director, 678-551-0840 [sprice@gatsa.org](mailto:sprice@gatsa.org)

The Technology Student Association (TSA) is a national organization for elementary, middle and high school students who are presently enrolled in or have completed technology education classes. Engineering & technology education classes have a twofold mission: to help students gain an understanding of the engineering career field, the development and use of technology and to assist in the development of individual potential. TSA fosters this mission by developing leadership abilities and instilling a sense of pride in one's work. TSA also promotes high standards of technical ability, scholarship and safety. TSA is an organization that values the unique capabilities of students and offers many opportunities for personal growth and success.

Technology Day at the Georgia National Fair provides Georgia TSA (Technology Student Association) members with an opportunity to compete in various competitions to win money for their chapter and participate in a motivational rally to help get you pumped up and excited about the year to come!

Open to all students who are presently or have been enrolled in any technology education class in any middle school or high school in the State of Georgia.



[www.GeorgiaNationalFair.com](http://www.GeorgiaNationalFair.com)

All exhibitors are required to read and abide by the Georgia National Fair General Rules and Regulations. PLEASE NOTE: IT IS YOUR RESPONSIBILITY TO READ AND UNDERSTAND THE RULES. If you have questions, you may certainly e-mail us at [sprice@gatsa.org](mailto:sprice@gatsa.org) or [contests@gnfa.com](mailto:contests@gnfa.com). Please help us prevent entry disqualifications.

Advisors are required to register online at GeorgiaNationalFair.com (<https://www.georgianationalfair.com/p/georgialiving/youth>) for all competitions by September 11, 2019. Late entries will not be accepted. No substitutions allowed. Required password must be obtained by Sept. 9.

Exhibitors will be required to turn in a copy of their online registration confirmation to check-in for competitions.

PLEASE NOTE THAT THE COMPETITIONS AND THE RALLY ARE TWO SEPARATE EVENTS AND REQUIRE SEPARATE REGISTRATION.

Rally information is included on the last page of this information. \*\*\*IMPORTANT - SEE CHANGES TO FAIR GATE ENTRY PROCEDURE AND FEES. For rally questions, please contact Georgia TSA at 678-551-0840 or [sprice@gatsa.org](mailto:sprice@gatsa.org).

## GEORGIA NATIONAL FAIR TSA SUPERIOR CHAPTER AWARD

**1<sup>st</sup> Place - Superior Chapter - \$500**  
**2<sup>nd</sup> Place - Reserve Superior Chapter - \$250**

Sponsored by the Georgia National Fair

All placings will be put on a point system, example: 1<sup>st</sup> place=10 pts, 2<sup>nd</sup> place=9 pts, etc. These points will be calculated by chapter and the chapter with the highest accumulated points after the last competition will receive a GNF Superior Chapter Award plaque and \$500. The second place chapter will receive a GNF Reserve Superior Chapter Award plaque and \$250.

**TSA RULES**

1. Open to all students who are presently or have been enrolled in any technology education class in any middle school or high school in the State of Georgia.
2. All participating students must report with their teacher/advisor to the East ticket gate for admittance.
3. Top ten entries will be on display in the Miller-Murphy-Howard Building during the remainder of the Fair; other projects may be picked up after 2:30 PM on October 7, 2019.
4. **Winning entries not picked up at the Fairgrounds after the Fair will be available at the GA TSA Leadercon '19 - Fall Leadership Conference. Any entries not picked up at that time will be discarded.**
5. **ONLINE REGISTRATION WITH GEORGIA NATIONAL FAIR IS REQUIRED FOR ALL ENTRIES. DEADLINE IS SEPT. 11, 2019. Late entries will not be accepted.**
6. **Exhibitors will be required to turn in a copy of their online registration confirmation to check-in for competitions. NO SUBSTITUTIONS WILL BE ALLOWED.**

**COMPETITIONS**

**Pre-judged Competitions:** Pre-judged Competitions will be turned in at CORE or electronically submitted by 11:59 PM **September 11, 2019**. These events will be judged during CORE (Chapter Officer Retreat for Excellence) and not at the Rally. None of those events will be at the Rally.

**On-site Competitions** will be judged on site with an interview or testing and must be turned in October 7, 2019 between 9:00 AM and 10:45 AM.

**TSA Events**

**Pre-judged Competitions**

- Architectural Design
- Georgia TSA Pin Design
- Program Promotion High School
- Program Promotion Middle School

**On-site Competitions**

- Alternative Energy Design - Wind Turbine
- Computer Integrated Manufacturing
- Mousetrap Car Challenge
- Robotic Challenge H.S. "Tractor Pull"
- Robotic Challenge M.S. "Tractor Pull"
- Structural Design - The Step Stool
- Transportation Modeling

<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th-7th</u>	<u>8th-10th</u>
\$100	\$75	\$50	\$25	\$15	\$10

Sponsored in part by:



# ARCHITECTURAL DESIGN CHALLENGE

THIS IS A CHAPTER EVENT AND MUST BE ENTERED IN THE CLUB NAME (ex. Smith High School TSA).

Enter online at [www.GeorgiaNationalFair.com](http://www.GeorgiaNationalFair.com)  
(<https://www.georgianationalfair.com/p/georgialiving/youth>) by September 11, 2019.

Entries are limited to one per chapter.

**DIVISION 40101 ARCHITECTURAL DESIGN CHALLENGE**

**CLASS**  
**01 Architectural Design Challenge**

**Design Challenge Background:** The “Tiny House Movement” is a social movement where people are choosing to downsize the space they live in. The typical American home is around 2,600 square feet, whereas the typical small or tiny house is between 100 and 400 square feet. **After studying various tiny house designs, students use technology to create their very own unique “Tiny House”.**

## OBJECTIVE:

Your team has been chosen to design a house to have a 400 square foot footprint or less as part of the Tiny House Movement. Your team must creatively design the house to include a food preparation/eating area, clothes washing/drying, bathroom, sleeping space and living space. The spaces can be flexible. You may also make use of vertical space.

## PROCEDURES:

The display must be two dimensional. **Students must submit their projects during the event check-in at CORE or have it shipped to The Kaplan-Mitchell Retreat and Conference Center prior to the 1st day of the conference.** The Drawing, Rendering, and Written Description shall be mounted on a 20x30 foam core board. See sample at bottom of page. During turn in, you will sign up for a time to return to your project to be interviewed by a judge. A copy of the online registration confirmation will be required to check-in for competition.

**A copy of the online registration confirmation will be required to check-in for competition.**

## CONTEST RULES:

The design must meet the following criteria:

1. **All exhibitors are required to read and abide by the Georgia National Fair General Rules and Regulations.**

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2. The participants are to design an architectural floor plan that meets the current year’s problem.

3. The floor plan is to be submitted on maximum drawing sheet cut size B (11” x 17”) with standard scale as found on Architectural triangular scale, (1/8” = 1’ - 0”, 1/4” = 1’ - 0”, etc.). Smaller format is acceptable.

4. A 3-D rendering must be submitted on maximum drawing sheet cut size B (11” x 17”). Smaller format is acceptable.

5. While 3-D modeling may be used to enhance the rendering, the actual habitat must be the original work of the student.

**Do not submit a physical 3-D model of your design.**

6. A written description of the style and merits of the design concepts must be included and must answer the following questions (1 page).

- How does your design meet the main requirements for the intended purpose?
- What are the advantages of your layout?
- Why have you included specific features?
- Please supply a list of all credits for any third party models used within your rendering.

**ARCHITECTURAL DESIGN CHALLENGE (continued)****EVALUATION:****Design (35 pts)**

- Does the design incorporate features needed and required for the intended purpose?
- Is the layout logical and functional?
- Are the sizes of the rooms adequate for their purpose?

**Quality (25 pts)**

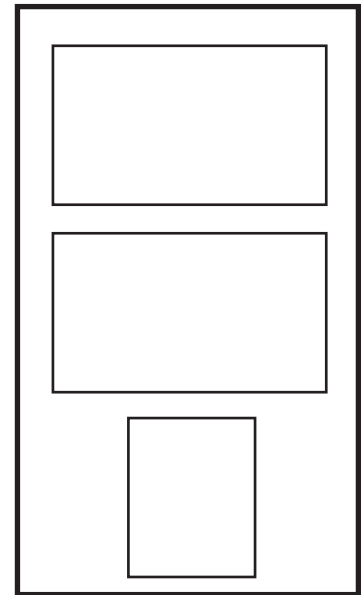
- Is the drawing neat and precise?
- Are rooms properly labeled?
- Are dimensions correctly placed?

**Written Description (25 pts)**

- How does your design meet the main requirements for the intended purpose?
- What are the advantages of your layout?
- Why have you included specific features?
- List of credits

**Rendering (15 points)**

- 3-D Rendering

**Sample of Mounting**

# GEORGIA TSA PIN DESIGN CHALLENGE

THIS IS AN INDIVIDUAL EVENT AND MUST BE ENTERED IN THE INDIVIDUAL'S NAME (ex. Bobby Smith).

Enter online at [www.GeorgiaNationalFair.com](http://www.GeorgiaNationalFair.com)  
(<https://www.georgianationalfair.com/p/georgialiving/youth>) by September 11, 2019.

**DIVISION 40201 GEORGIA TSA PIN DESIGN CHALLENGE**

## CLASS

**01 Georgia TSA Pin Design Challenge**

**OBJECTIVE:** Participants design a lapel pin that can be used to promote Georgia TSA at legislative events and that members can trade at the TSA National Conference Mixer.

**Entries are limited to three per chapter.**

**PROCEDURES:** Students must upload their designs via the GA TSA Event Management System Tech Day Registration site no later than midnight September 11, 2019 in a PDF document.

**A copy of the online registration confirmation will be required to check-in for competition.**

## CONTEST RULES:

1. **All exhibitors are required to read and abide by the Georgia National Fair General Rules and Regulations.**

**PLEASE NOTE: IT IS YOUR RESPONSIBILITY TO READ AND UNDERSTAND THE RULES. If you have questions, you may certainly e-mail us at [sprice@gatsa.org](mailto:sprice@gatsa.org) or [contests@gnfa.com](mailto:contests@gnfa.com). Please help us prevent entry disqualifications.**

2. The design must meet the following criteria:

- Any and all use of the TSA emblem must abide by TSA Trademark Policies as outlined in the National TSA webpage at [www.tsaweb.org](http://www.tsaweb.org). You cannot alter the logo or its parts. (ie: using standard font in place of the logo letters in the logo)
- There must be no use of copyrighted materials other than the TSA logo.
- Participants will design a TSA pin that can be worn on blazers, jackets, shirts, sweaters, or blouses.
- The pin must include the letters TSA. It must also include either the state shape or the word Georgia or both in the design. Icons that represent our state have been used in previous designs.
- The design of the lapel pin must avoid using the shape of the state filled with art. Please be creative with the shape and make something unique and creative. The state shape may be used in the art, but must not be the shape of the pin.
- The design must be computer generated and submitted as an 8 ½" x 11" document and must include the design in both actual size and in an enlarged version to show detail.
- The actual pin size will range from ¾" to 2". The size and number of letters in the design must be taken into consideration; a letter on a 10 inch piece of paper will be reduced to 1/10 of an inch on a 1" pin. Therefore, fewer letters and greater size is recommended for a more legible pin.

## EVALUATION:

Submissions will be screened for rules infractions by the competition committee prior to being judged by all attending participants at CORE. Each registered Chapter will receive colored tickets to vote for the BEST design. Each entry's votes will be counted and ranked to determine Top 10 Placements for Tech Day.

NOTE: Georgia TSA reserves the right to make any changes to the design which may conflict with its production. All pin designs become the property of GA TSA. When a participant enters a design, he or she relinquishes all rights for the sale and use of the design to GA TSA.

# PROGRAM PROMOTION CHALLENGE

**THIS IS A CHAPTER EVENT AND MUST BE ENTERED IN THE CLUB NAME (ex. Smith High School TSA).**

Enter online at [www.GeorgiaNationalFair.com](http://www.GeorgiaNationalFair.com)  
(<https://www.georgianationalfair.com/p/georgialiving/youth>) by September 11, 2019.

**DIVISION 40303 PROGRAM PROMOTION CHALLENGE MIDDLE SCHOOL  
40304 PROGRAM PROMOTION CHALLENGE HIGH SCHOOL**

## **CLASS**

### **01 Program Promotion Challenge**

**OBJECTIVE:** Chapter members must work together to create a display that could be used to Promote their school's STEM/Engineering Program offerings which includes their TSA chapter. The display could be used at PTSA or Open House to explain/advertise all that your STEM/Engineering Program has to offer. Program Promotional Challenge will be judged on both the middle school and high school levels. Places will be awarded for this event on each level.

**Entries are limited to one per chapter.**

**PROCEDURES:** Students must submit their display during check-in at CORE on September 13, 2019. Tech Day entrants who cannot attend CORE may ship their entry to Steve Price, GA TSA c/o Kaplan Mitchell Retreat and Conference Center, 70 Darom Lane - Clayton, GA 30525 to arrive by September 13, 2019, or have the entry brought to CORE by another Chapter. GA TSA is not responsible for entries lost in shipping. No entries for Middle or High School challenge will be accepted at Tech Day.

**A copy of the online registration confirmation will be required to check-in for competition.**

## **CONTEST RULES:**

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- 2. The total assembled maximum display size is 46" in width, 36" in height, and 18" in depth. Although some pieces on the display may be made from plastic or wood, the main board may not be made from solid plastic such as Acrylic or PVC. However, sign making materials like Coroplast and Fome-Cor are acceptable.**
- 3. The display must be able to fold flat for transporting and storing. Attachments must be able to be removed and the chapter must provide a labeled container to store the loose attachments in, with specific instructions as to where these are to be placed and how to set up the display. Maximum Container Size: 10"x12"x15"**
- 4. The use of copyrighted artwork or characters is prohibited and will result in disqualification.**
- 5. The entry must be a display only. Extra printed materials must not be submitted with the display and will not be judged as a part of the project (ie. brochures, flyers, etc.).**
- 6. Theme of the entry must be "Your School's STEM/Engineering Program".**
- 7. Electricity will not be provided for the displays.**
- 8. The top entries will be displayed during the Georgia National Fair; therefore, chapters must be prepared to leave their display in its entirety. The use of expensive accessories (such as laptop computers, tape players, etc.) is strongly discouraged unless the team is prepared to leave the item for the duration of the Georgia National Fair. Neither the Georgia National Fair nor Georgia TSA will be responsible for these items.**

## **EVALUATION:**

**Submissions will be screened for rules infractions by the competition committee prior to being judged and ranked to determine top 10 placements for Tech Day.**

# ALTERNATIVE ENERGY DESIGN

**THIS IS A CHAPTER EVENT AND MUST BE ENTERED IN THE CLUB NAME** (ex. Smith High School TSA).

Enter online at [www.GeorgiaNationalFair.com](http://www.GeorgiaNationalFair.com)  
(<https://www.georgianationalfair.com/p/georgialiving/youth>) by September 11, 2019.

**DIVISION 40401 Alternative Energy Design**

**CLASS**  
**01 Wind Turbine**

**OBJECTIVE:** The objective is to build a wind turbine fan that will generate the highest voltage.

**Entries are limited to one per chapter.** (One team member will demonstrate on site.)

**PROCEDURES:** One (1) Student per team must submit the completed fan during check-in at Reaves Arena at the Georgia National Fair. During turn in, you will sign up for a time to return setup and test your blade system.

**A copy of the online registration confirmation will be required to check-in for competition.**

## CONTEST RULES:

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2. Students will sign up for a time slot and test their own devices in front of the judges. Students will have 30 seconds to set up prior to testing.

3. The device must pass a GO-NO-GO inspection including a safety inspection to insure no harm or damage will occur. Any unsafe devices WILL NOT BE TESTED and be counted as a disqualification.

4. The device must meet the following specs:

- Stand Height: 24 in (must use stand with gear box system provided by GATSA)
- Maximum blade diameter: 36 in
- Maximum number of blades: 12

## MATERIALS:

- KidWind Wind Turbine Hub - Part # KW-WTH3 - Part Url is:<http://www.vernier.com/products/kidwind/wind-energy/kw-wth3/>
- Any materials may be used for blades and must be attached by dowel to the hub
- Dowel material is student choice

## TESTING:

- Student will attach their hub and blade system to the provided KidWind Stand and Gear System. Only the approved Kidwind Hub will be used. Part Url is:<http://www.vernier.com/products/kidwind/wind-energy/kw-wth3/>
- 4 Box fans will be used to create a wind tunnel (2 fans on bottom with 2 fans on top). Wind tunnel will be 48inx48inx48in cube open on the back

## EVALUATION:

- Voltage will be measured using a multimeter attached to the generator leads.
- Student will have three opportunities and the three voltages will be averaged.
- Award places determined by voltage ranking.
- Ties will be broken by testing efficiency of the wind turbine.

Include Challenge!  
Dorothy Sutton  
Romain High School



# *New* COMPUTER INTEGRATED MANUFACTURING

**THIS IS A CHAPTER EVENT AND MUST BE ENTERED IN THE CLUB NAME (ex. Smith High School TSA).**

**Enter online at [www.GeorgiaNationalFair.com](http://www.GeorgiaNationalFair.com)  
(<https://www.georgianationalfair.com/p/georgialiving/youth>) by September 11, 2019.**

**DIVISION 40501 Computer Integrated Manufacturing**

**CLASS  
01 Computer Integrated Manufacturing**

**OBJECTIVE:** Participants will use Computer Integrated Manufacturing (CIM) to design and create a product that fits the year's theme. The product may use additive and/or subtractive manufacturing of any traditional, Computer Numerical Control (CNC), 3D printing, or laser technology available. This year's theme is an accessory for a cell phone or tablet.

**Entries are limited to one per chapter.** (There can be up to 4 members on the team)

**PROCEDURES:** Students should submit the completed product and the display board during check-in at Georgia National Fair at Reaves Arena and schedule their interview/product explanation. Rubric scores will be based on a review of the product and the display and the interview/product explanation.

**A copy of the online registration confirmation will be required to check-in for competition.**

#### **CONTEST RULES:**

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**2. Students will comprise a team of up to 4 individuals to design and create a cell phone or tablet accessory.**

**Product:** One sample of the manufactured product must be submitted

- The product may use additive and/or subtractive manufacturing of any traditional, Computer Numerical Control (CNC), 3D printing, or laser technology available.
- The product may be a single piece or multiple pieces.
- The finished product may not exceed 8"x8"x8".
- The product may be made of wood, plastic, or metal.
- Stock fasteners may be used. These include (but are not limited to) nuts, washers, screws, etc.
- Parts may be finished (sanded, painted, stained) if necessary.
- A cell phone or tablet SHOULD NOT be submitted with the product (Pictures on the display should show the product being used with a phone or tablet).

**Display:** A 20"x30" foam core, two-dimensional display must be submitted, containing the following items:

- The name of the event (Computer Integrated Manufacturing)
- The name and description of the product created, including the purpose of the product
- A CAD drawing of the product (This may be a working drawing or an isometric assembly drawing.)
- At least four pictures of the product being manufactured and tested (Captions must accompany each picture.)
- A flyer for selling the product, including a selling price (not to exceed 8 ½ " X 11")

EVALUATION:

<b>CRITERIA</b>	<b>Minimal performance 1-4 points</b>	<b>Adequate performance 5-8 points</b>	<b>Exemplary performance 9-10 points</b>
Product: Theme	The effort is basic, with only a loose association to the product theme.	The effort adequately addresses the product theme.	The effort to address the product theme exceeds expectations.
Product: Additive or subtractive manufacturing piece (x2)	Finished product is poorly constructed and/ or doesn't match the CAD drawing on the display.	The product quality could be improved or the product doesn't match the CAD drawing.	Product is attractive and neat and matches the CAD drawing indicated on the display.
Display: Components	Four or more components are missing from the display.	Two or three of the required components are missing from the display.	The display contains the name of the event, name of the product, a description and purpose of the product, a CAD drawing, at least four photographs, and a flyer.
Display: Drawing	The CAD drawing is poorly executed with key elements missing.	A CAD drawing is included, but components are missing from the drawing.	An accurate CAD drawing is included in the display.
Display: Photographs	Photographs are not labeled or do not show the process or testing of the finished product.	Some photographs are missing or are not clearly labeled.	Four or more photographs of the manufacturing process and testing of the finished product. All photographs are clearly labeled.
Display: Flyer	Sales flyer minimally attempts to sell the manufactured product.	Sales flyer is too large or does not adequately attempt to sell the product.	Sales flyer which does not exceed 8 1/2X11" is included and adequately attempts to sell the product.
Interview/Pitch: Student Performance	Student is unprepared for interview, exhibits nervous behavior, trouble answering questions.	Student is adequately prepared for the interview/performance stage. Exhibits slight nervousness, answers are just adequate.	Student is thoroughly prepared for all questions and their performance is exemplary. Does not seem nervous. Shows confidence and answers are thorough.

# MOUSETRAP CAR CHALLENGE

**THIS IS A CHAPTER EVENT AND MUST BE ENTERED IN THE CLUB NAME** (ex. Smith High School TSA).

Enter online at [www.GeorgiaNationalFair.com](http://www.GeorgiaNationalFair.com)  
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**DIVISION 40601 MOUSETRAP CAR CHALLENGE**

## CLASS

### 01 Mousetrap Car Challenge

**OBJECTIVE:** The objective is to build a vehicle that is powered solely by a standard-sized mouse trap that will travel and stop closest to a finish line located 22 feet from the start line in the shortest amount of time.

**Entries are limited to one per chapter.** (There can be up to 4 members on the team.)

**PROCEDURES:** Students must submit the completed car during check-in at Reaves Arena at the Georgia National Fair. During turn in, you will sign up for a time to return and run your car.

**A copy of the online registration confirmation will be required to check-in for competition.**

## CONTEST RULES:

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2. Students will comprise a team of up to 4 individuals to create a Mousetrap Car/Vehicle.

3. The vehicle MUST be powered by a single VICTOR brand mouse trap measuring: 3 7/8" L x 1 3/4" W. The mouse trap spring CANNOT BE ALTERED to add power in any way.

4. The vehicle may not start with additional potential and/or kinetic energy other than what is stored in the mouse trap spring. Vehicles MUST be self-starting. Rubber bands or any other elastic materials may not be used in the launch mechanism.

5. The vehicle must steer itself and may not receive a push in any direction in order to avoid a collision.

6. The vehicle must have 3 or 4 wheels that make contact with the race surface.

7. The timing of the vehicle will begin when any part of the vehicle passes over the start line and will end when the vehicle comes to rest.

8. The distance from the target will be measured from the point of the vehicle that first passed the start line to the finish line or target.

9. The overall dimensions of the Mousetrap Car cannot exceed 20" L x 10" W x 12" H. The measurement will be taken while car is in resting position.

## TESTING:

The course will be smooth level floor and non-carpeted. The winner will be the vehicle that has obtained the lowest score in either of the two attempts. Any ties will be decided by a single runoff between the tied vehicles.

## EVALUATION:

The scoring will be the total of the time in seconds added to the distance from the finish line in centimeters.

Score=time(s) + distance from finish line (cm). The lowest number is the best car.

# ROBOTICS CHALLENGE

**THIS IS A CHAPTER EVENT AND MUST BE ENTERED IN THE CLUB NAME** (ex. Smith High School TSA).

Enter online at [www.GeorgiaNationalFair.com](http://www.GeorgiaNationalFair.com)  
(<https://www.georgianationalfair.com/p/georgialiving/youth>) by September 11, 2019.

**DIVISION 40703 ROBOTICS CHALLENGE MIDDLE SCHOOL**  
**40704 ROBOTICS PROMOTION CHALLENGE HIGH SCHOOL**

## CLASS

**01 Robotics Challenge - Tractor Pull**

**OBJECTIVE:** Design and build a robot that will pull a sled in a tractor pull style event. Robots must meet the criteria and constraints set forth. Robots will compete in elimination rounds with each round requiring the robot to pull a heavier and heavier "Full Load".

**Entries are limited to one per chapter with up to three members on each team.**

**PROCEDURES:** Students must submit the completed robot for inspection during check-in at the Georgia National Fair at Reaves Arena. Go/No Go criteria will be used to determine eligibility.

**A copy of the online registration confirmation will be required to check-in for competition.**

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2. Robots must pass a GO-NO-GO inspection including a safety inspection to insure no harm or damage will occur. Any robot not passing full Go-No-Go inspection will be disqualified. Challenges to a "No-Go" decision must be made before removing the robot from the holding site. Any robot handled or moved after the initial submission will not be re-evaluated by the judges.

3. Criteria and Constraints:

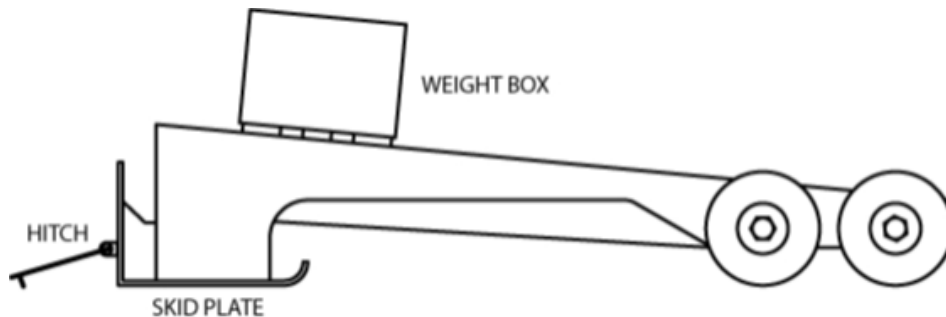
- Robot can use no more than 4 motors: VEX, FLL, or any DC Motor.
- Robot can have no more than 6 wheels: VEX, FLL, or custom. If the robot uses track or chain drive, each gear turning the track or chain will count as a wheel. Wheels may not be modified with metal spikes or other material that could potentially cause injury when the wheels are spinning.
- Acceptable robot construction materials include VEX parts, FLL parts, or custom created metal chassis. The robot cannot be constructed using glue, tape, cardboard, or packing materials (Tape is acceptable only on electrical wires).
- Robots must be no more than 16" x 13" x 9" (WxDxH). They may not expand beyond their starting size constraints. A box jig will be used to test compliance. The robot must fit in a box that reflects max dimensions.
- The robot may not exceed 6 pounds in weight (including the battery). The weight will be measured with a digital Vernier force gauge.
- Each robot must have a strong horizontally mounted hitch point on its centerline at the rear of the robot, 3/4" plus or minus 1/4" from the floor for attachment to the sled hitch. (The hitch counts as part of the total length.) This hitch must be able to accommodate a hitch pin that measures 3/8" in diameter. This hitch must be sturdy because it will be the main connection your robot has to the Full Pull XL sled. If a hitch fails during a pull, the team may not retry the pull.
- Robots may not be modified during the event. They can be repaired with referee approval. No significant changes can be made during the repair. The robot must be re-inspected before it will be allowed to compete. Teams may be requested to submit to random inspections by event personnel. Refusal to submit to the inspection will result in disqualification. Referees or inspectors may decide that a robot is in violation of the rules. This will result in a disqualification.
- Robots may not lift the front of the sled. The skid plate must maintain contact with the playing surface at all times.
- The robot must be student constructed and NOT from a preassembled kit. For example, RC devices from a box may not be used.
- Any weight added to the robot must be securely attached to the robot.

**ROBOTICS CHALLENGE (continued)****The Track:**

The track is constructed of commercial-grade, low pile carpet. The pulling area is designated by a taped outline that measures 20" wide and 72" long. All other areas outside of, and including, the tape is considered out of bounds.

**The Sled**

The Full Pull XL sled is 29 inches long and weighs approximately 15 pounds when empty. The skid plate rests on the track surface, and all four rear tires are free to rotate. The sled utilizes a chain and sprocket system to move the weight box up the back of the sled as it moves forward. At the start of a pull, all of the weight is over the sled's rear wheels. As the sled is pulled along the track, the weights are pulled forward of the sled's wheels. This pushes the front of the sled into the carpet, increasing friction. As the weight is added to the sled, the resulting forces increase and eventually overwhelm the pulling device.

**Device (Go or No-Go)**

- Does the robot meet the maximum motor specifications (no more than 4)?
- Does the robot meet the maximum wheel specifications (no more than 6)?
- Is the robot made from VEX, FLL, or a metal chassis?
- Is the robot within the size specifications?
- Is the robot within the weight specifications?
- Is the robot a custom built robot?
- Is there a hitch point per the criteria and constraints?

**The Competition:**

1. Robots will be attached to the sled and positioned such that the sled is lined up with the track starting line, and the robot is in front of the sled on the track.
2. A "Full Pull" is achieved when the front of the sled crosses the tape at the end of the pulling track. A "Full Pull" is 60 inches. Robots must make it the entire length of the course within 60 seconds or they will be eliminated.
3. The first pull will consist of robots attempting a "Full Pull" of the sled only (the sled weight box will be empty). All robots that complete a "Full Pull" will advance to the next round. If 10 robots do not advance to the next round, the top 10 will be determined based on the length and time of the pull.
4. In the second and following pulls, increments of five pounds of weight will be added to the sled. Pull rounds will continue until the top 10 ranking is achieved. If the final few robots are all eliminated pulling the same amount of weight, the winner will be determined by which team pulled the greatest distance. In the event that there is still a tie, the amount of time it took to achieve the distance will be used.
5. During the pull, the driver must remain at their station until released by the referee.
6. There may be only one driver for each pull.
7. If a robot makes contact with or goes over the taped field outline, the pull is over and the time and distance will be recorded.
8. Once a team begins a pull, they may not stop or reverse and start again. Robots are not allowed to stop during the pull. The judge will determine if a robot has stopped and restarted.
9. If a robot becomes stuck or disabled on the pull track or any track element, or if a team's power fails during a pull, no interventions may be made.
10. If at any time the robot operation is deemed unsafe or has damaged the playing track surface or sled, the referees will stop the pull and the offending team will not be allowed to finish their pull.
11. In case of a sled failure, the pull will be replayed.

**The top 10 robots will be left for display at the Georgia National Fair. However, the battery, remote control, and microcontroller, in example VEX Cortex Microcontroller, will be allowed to be removed from the robot. The chassis and drivetrain (wheels and motors) will not be allowed to be removed. Robots will be returned to schools after the Georgia National Fair.**

# STRUCTURAL DESIGN CHALLENGE

THIS IS A CHAPTER EVENT AND MUST BE ENTERED IN THE CLUB NAME (ex. Smith High School TSA).

Enter online at [www.GeorgiaNationalFair.com](http://www.GeorgiaNationalFair.com)

(<https://www.georgianationalfair.com/p/georgialiving/youth>) by September 11, 2019.

## DIVISION 40801 STRUCTURAL DESIGN CHALLENGE

40901

### CLASS

#### 01 The Step Stool

**OBJECTIVE:** Design and build a collapsible, cardboard step stool that will support a person up to 300 lbs. with comfortable stability. You will use the engineering design process and keep track of brainstorming, iterations, sketches and the prototyping process. Your stool and an engineering notebook will all be submitted as part of this competition.

**Entries are limited to one per chapter (there can be up to 4 members on the team).**

**PROCEDURES:** Students must submit the completed chair and engineering book during check-in at the Georgia National Fair at Reaves Arena. Go/No Go criteria will be used to determine eligibility. A time sheet will be provided for sign-up at check in for for interview times after the top twelve are established. Rubric scores will be based on a review of the engineering book and interviews.

**A copy of the online registration confirmation will be required to check-in for competition.**

#### CONTEST RULES:

**All exhibitors are required to read and abide by the Georgia National Fair General Rules and Regulations.**

**PLEASE NOTE: IT IS YOUR RESPONSIBILITY TO READ AND UNDERSTAND THE RULES. If you have questions, you may certainly e-mail us at [sprice@gatsa.org](mailto:sprice@gatsa.org) or [contests@gnfa.com](mailto:contests@gnfa.com). Please help us prevent entry disqualifications.**

Criteria and Constraints (Stools not meeting these criteria will result in a disqualification.):

1. The Step Stool must be made entirely out of cardboard and glue.
2. The Step Stool must have two steps and a functional hand rail for support.
3. The height of the bottom step must be between 8" and 9" from the floor.
4. The height of the top step must be between 16" and 17" from the floor.
5. The top of the support rail must be between 28" and 30" from the floor.
6. The stool should have a total width of no more than 18".
7. The Step Stool must be collapsible for easy storage with a mass of no more than 8 lbs.
8. The Step Stool must support a mass of up to 300 lbs. without showing major signs of stress.
9. The entry must include an engineering notebook contained in a Clear-Front Report Cover. No other formats will be acceptable.

#### EVALUATION:

The chair must pass a GO-NO-GO inspection:

- Is the stool made entirely out of cardboard and glue (no paint or non-cardboard parts)?
- Does the stool have 2 steps and a support rail?
- Is the top of the first step between 8" and 9" from the floor?
- Is the top of the second step between 16" and 17" from the floor?
- Is the height of the handrail between 28" and 30" from the floor?
- Does the width of stool exceed 18"?
- Is the stool portable (able to be carried through standard doors) with a mass of no more than 8 lbs.?
- Does the stool support a mass of up to 300 lbs. without showing major signs of stress?

Any device receiving a "No" answer to any of the above requirements will result in the device NOT BEING FURTHER EVALUATED.



**STRUCTURAL DESIGN CHALLENGE (continued)**

**Engineering Rubric:**

- Has the objective been clearly identified? Score 0 - 5
- Drawings have been included that show an overall design process. These drawings appear throughout the book and clearly show a progression of brainstorming, iterations, prototyping, and testing. Score 0 - 5
- Daily logs have been included that represent at least 5 days worth of work. Score 0 - 5
- A clear prototype testing process is shown to evaluate various iterations of the chair. Score 0 - 5

**Interview Rubric:**

<b>CRITERIA</b>	<b>Minimal performance 1-4 points</b>	<b>Adequate performance 5-8 points</b>	<b>Exemplary performance 9-10 points</b>
Organization	Participant(s) seem(s) unorganized and unprepared for the presentation/interview.	Participant(s) is/are generally prepared/organized in the overall presentation/interview.	The presentation/interview is logical, well organized, and easy to follow.
Knowledge	Participant(s) seem(s) to have little understanding of the concepts of the design challenge; vague answers to interview questions are provided.	An understanding of the concepts of the design challenge, and answers to questions, are adequate.	There is clear evidence of a thorough understanding of the design challenge; questions are answered well.
Articulation	The presentation and interview provide an unclear, unorganized, and or illogical description of the project.	The presentation and interview offer a somewhat logical and easy-to-understand project description.	The presentation/interview provides a clear, concise, and easy-to-follow description of the project.
Delivery	The team/individual is verbose and/or uncertain in the presentation/interview; participant posture, gestures, and lack of eye contact diminish the delivery.	The team/individual is somewhat well-spoken and clear in the presentation/interview; participant posture, gestures, and eye contact result in an acceptable delivery.	The team/individual is well-spoken and distinct in the presentation/interview; participant posture, gestures, and eye contact result in a polished, natural, and effective delivery.

# TRANSPORTATION MODELING

**THIS IS AN INDIVIDUAL EVENT AND MUST BE ENTERED IN THE INDIVIDUAL'S NAME (ex. Bobby Smith).**

**Enter online at [www.GeorgiaNationalFair.com](http://www.GeorgiaNationalFair.com)  
(<https://www.georgianationalfair.com/p/georgialiving/youth>) by September 11, 2019.**

**DIVISION 40901 Transportation Modeling**

## **CLASS**

**01 Transportation Modeling - Manned Surface Exploration Vehicle - for the Moon or Mars**

**OBJECTIVE:** Using only certain materials and following required specifications, participants research, design and produce a scale model of a vehicle that fits the annual design problem and that takes appearance and realism into consideration. The design theme is Manned Surface Exploration Vehicle – for the Moon or Mars – Consideration must be shown or explained regarding how the vehicle will be transported and assembled at the destination.

**Entries are limited to three individuals per chapter and one entry per individual.**

**PROCEDURES:** Entries must be started and completed during the current school year. Students must submit the completed car during check-in at Reaves Arena at the Georgia national Fair. During turn in, you will sign up for a time to return and be interviewed.

**A copy of the online registration confirmation will be required to check-in for competition.**

## **CONTEST RULES:**

**1. All exhibitors are required to read and abide by the Georgia National Fair General Rules and Regulations.**

**PLEASE NOTE: IT IS YOUR RESPONSIBILITY TO READ AND UNDERSTAND THE RULES. If you have questions, you may certainly e-mail us at [sprice@gatsa.org](mailto:sprice@gatsa.org) or [contests@gnfa.com](mailto:contests@gnfa.com). Please help us prevent entry disqualifications.**

**2. The device must pass a GO-NO-GO inspection including a safety inspection to insure no harm or damage will occur. Any unsafe devices WILL NOT BE TESTED and be counted as a disqualification.**

- Vehicle scale model is present.
- The entry reflects the current year design theme.
- The model is inside the display and the entire display is less than 16"x16"x16".
- Glass or liquids are not involved in the entry.

**3. Chapter entries must include a scale model and a display.**

**4. Model and display must meet the following specifications:**

**Model:**

- The scale model must accurately reflect the annual design problem (see above).
- The model main body itself must be made from scratch by the member entering the event.
- **Using pre-manufactured model vehicle body parts is prohibited. (Including Hoods, Fenders, wings, propellers, frames, etc.)**
- \*It is permissible to use pre-manufactured parts such as body strengtheners, plastic canopy, exhausts, mirrors, head and tail lights, windshields and antennae. They may be attached to or enclosed within the vehicle and may be constructed from materials other than wood, excluding glass or liquids. These parts must be fastened securely.
- \*It is permissible to use 3D Printers in the production of the parts of this model.
- The finished vehicle size must fit inside the display space of 16"x16"x16".
- The themed vehicle model must have an actual length that measures at least 6".
- The designer must choose a scale for the vehicle so that it meets the size requirement. The chosen scale must an actual length that measures at least 6".



**TRANSPORTATION MODELING (continued)**

Wheels:

- Dimensions must be consistent with the scale of the body.
- Wheels must roll.

Display:

- The model must be presented for evaluation on a display not to exceed 16" tall x 16" deep x 16" long (including the model). No electrical access will be provided for displays. Use of Dry Cell batteries is permissible but must be contained within the stated display space.

Judging Rubric

Go-No-Go

The display size is no more than 16"x 16"x 16".

EVALUATION:

Entries are evaluated by a combination of points earned from the model, and display.

Paint/Finish/Overall

Paint/Finish/Overall Aesthetics.....	(40 pts)
Graphics.....	(10 pts)
Accompanying Display .....	(30 pts)
Interview.....	(20 pts)

