

# MECHANICAL ENGINEERING

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

**Enter online at [www.GeorgiaNationalFair.com](http://www.GeorgiaNationalFair.com)  
(<http://www.georgianationalfair.com/youth-educational-exhibits/>) by September 13, 2017.**

**DIVISION 40601 Mechanical Engineering**

**CLASS  
01 Perpetual Motion Machine**

**OBJECTIVE:** Participants will design and build a perpetual motion machine. A perpetual motion machine is a machine that has continuous motion with no human interaction after triggering the device. Create a video entry that shows your machine design entry in motion. The video entry must be uploaded to the EMS. When submitting physical media, the video needs to be at least 720p (1080p+ preferred) and uploaded to the EMS as an MPEG4 (Max size 1.5 GB). The video must be at least one (1) minute long and cannot exceed three (3) minutes in length. Only clear and audible videos will be accepted. All video entries submitted become the sole property of Georgia TSA.

The video must be uploaded by Midnight on September 13, 2017.

Semifinalists will be posted, the week prior to Tech Day, in the latest news section of the GA TSA website (bottom left hand corner) and advisors will receive an email.

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

**PROCEDURES:** Semifinalist should submit their completed machine during the event check-in at Reaves Arena at the Georgia National Fair. Students will sign up for a time slot during check-in. Students will set up and set off the machine in front of the judges - 60 second max time.

**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. Students will comprise a team of up to 4 individuals to create a Perpetual Motion Machine.

3. You MAY NOT use any of the following materials:

- Glass (marbles are excluded)
- Flammable, corrosive, or explosive materials
- Compounds that produce odors or gases
- Electronics or electrical devices
- Liquids, flying objects or suspended objects must be contained in the given area and display standard safety practices of a classroom or lab setting.

4. 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 will be counted as a disqualification.

5. Students will sign up for a time slot and test their own devices in front of the judges. Students will have 60 seconds to set up prior to testing.

6. Once triggered, the device has 10 seconds to begin. The entire event will be timed. 10 Points will be deducted for devices taking longer than 10 seconds to trigger. Time will stop at 3 minutes and be judged. If motion does not begin in 15 seconds, the entry will have failed. Your goal is to create a machine that will last at least three minutes.

7. The entry should be clean and neatly constructed. It should also be constructed in such a way as to be attractive on display. Points will be assessed based on the final product, construction, efficiency, and appearance.

8. Instructions on how to operate the device must be included. They should be clearly visible and easy to read. They do not have to be permanently affixed to the device, but should be easy to find and clearly explain how to operate the machine.

All entries must meet the following guidelines:

- The entry and all elements of the entry must be the entrant’s original work.
- The video entry must not be less one (1) minute in length and shall not exceed three (3) minutes total running time. The video entry must clearly show the function of your machine in motion. You are welcome to narrate and explain the function of your design, but this is not required.
- The entry must not violate the intellectual property rights of any third party. That means that the video should not contain a trademark or logo of another company, nor any copyrighted materials such as music, photographs, artwork or patents.
- The top 15 finalists will bring their entry for final judging to the fairgrounds and the top 10 will be left for display.
- Size and Weight Limits are as follows:
  - Maximum weight of your entry is 10 pounds.
  - Maximum dimensions of 18” x 18” x 18” must be followed.

Device (Go or No-Go)

- Is the video uploaded to the EMS in the correct format?.....(Yes/No)
- Is the device larger than allowed (18”x18”x18”)?.....(Yes/No)
- Does the device weigh less than or exactly the maximum weight?.....(Yes/No)
- Does the device contain illegal liquids or dangerous materials?.....(Yes/No)
- Is the device safe to operate and adhere to standard safety procedures?.....(Yes/No)
- The device is powered on its own without battery, solar or electrical power.....(Yes/No)

Any device receiving a “No” answer to any of the above requirements will result in the device NOT BEING TESTED.

**EVALUATION:**

Eligible entries will be judged by a panel of judges that will select the winners on the basis originality of design, longevity of the motion maintained, efficiency of the machine, engineering and build quality of the machine itself.

- Attractiveness, Neatness of the Product Design (20 pts.)
- Ingenuity of Design (30 pts.)
- Time in motion (1-10 pts. based on time)\*
- Instructions for operation (10 pts.)
- Efficiency (20 pts.)
- Additional creativity in video, design or presentation.(+5 pts. each)

\*Points for time will be awarded based on this scale:

- 3 min. will receive 10 points
- 2:30 to 2:59 will receive 8 points
- 2 min. to 2:29 will receive 6 points
- 1:30 to 1:59 will receive 4 points
- 1 min. to 1:29 will receive 2 points
- less than 1 min. will receive 0 points