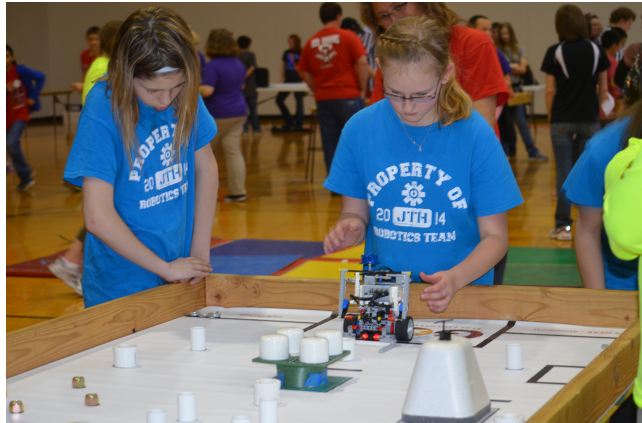


## Virtual GEAR Competition

[Get Excited About Robotics](#) (GEAR) is a LEGO MINDSTORMS EV3 robotics challenge offered to learners aged 14 years old or younger. “GEAR was created to foster interest among today’s youth in a career in engineering, science or technology. It is vital that they learn how engineers and scientists add value to our society and without them the world today would not be possible. Engineers and scientists are the true heroes of our modern world.” (Robert Acosta, President of GEAR Robotics). GEAR competitions have been offered at Texas Tech University for over 10 years.

The Virtual GEAR competition is designed for teams that cannot/do not want to travel to an on-site GEAR competition and broadens participation to an international audience. Robots are designed and tested locally. Teams create and upload videos demonstrating their robots’ performance and explaining their engineering design process.

The robot is designed using LEGO MINDSTORMS EV3/NXT kits and autonomously has to perform a variety of tasks within two minutes on a 4’ x 4’ game field. The game elements consist of inexpensive supermarket/hardware store items and the game mat can easily be created using a white surface and electric tape. Both, instructions for the design of playing field and a list of required game elements will be



released several weeks before the competition allowing even rural teams to be prepared at the kickoff day of the competition. There is no registration fee and no requirement to travel, since all communication will be done via video conferencing and social media, thus the name Virtual GEAR. The challenge is designed in such a way that beginners can accomplish several tasks, while advanced teams can practice and improve their game strategy and robot design skills. The competition runs for 8 weeks and the recommended time commitment is 1-2 hours per week, assuming participants already know how to program LEGO robots (approx. 6-10 h of exposure to LEGO robotics).

Each robotics program may enter up to two teams into the Virtual GEAR competition. There is no registration fee, but coaches are responsible for the purchase of game elements and the creation (taping/printing) of the game field and [online registration](#) is required. They also need to recruit their team members. There is no limitation on the number of learners in a team. It is recommended that teams consist of at least 3 and at most 6 members. All learners must be 14 years old or younger on the day of the competition. We will offer two categories of GEAR: “First Timers” is for teams that have never participated in a LEGO robotics

competition; “Global Competitors” is for teams that want to interact with teams from other locations during their robot design. More information on both categories can be found below. All communication during the competition will be in English. Non-native English speakers are encouraged to participate and improve their English language skills.

The 2017 GEAR competition theme is “Flippin’ Out”, describing applications of robotics in restaurants and diners. Below, you find information regarding the required resources, and the anticipated timeline.

#### **Required Resources and Technology:**

- 1 LEGO MINDSTORMS EV3/NXT robotics kit per team
- 1 computer/laptop with EV3/NXT software installed per team
- Internet access
- Video recording capabilities (anything from cell phone to professional video camera) and ability to upload videos to the Internet, e.g. to Google Drive
- Live video conferencing capability during Game Day, e.g. through Skype, Lync, Facetime.



#### **Eligibility/Limitations:**

- Only two teams per robotics program; each team must have an adult coach. A coach can oversee several teams.
- All communication is in English; non-native speakers with limited English language skills are encouraged to participate. It is the aim of the competition to promote English as a global language of communication and encourage learners to improve their language skills through robotics.

#### **Sequence of Events/Timeline:**

- 31 January: Deadline to register for Virtual GEAR competition online. Game field and game element information is sent out to registered teams.
- 1-3 February: Video Conference for all Virtual GEAR coaches to provide more information about competition rules and format.
- 24 February: Deadline to Upload Team Introduction Video: Each team creates a video (max. 2 minutes) to introduce themselves (who they are, where they are located, how robotics is implemented at their school/club, why they are participating) and upload the video to Google Drive (login information will be provided). Collaboration with e.g. a digital media class/club is encouraged but all work must be done by students aged

14 or younger. Teams that fail to upload the Team Introduction Video cannot participate in the competition. Videos will be shared with all Virtual GEAR teams to create a sense of community.

- 24 February: Virtual GEAR Kickoff: Game rules will be sent out to team coaches.
- 31 March: Deadline to upload Trial Run Video:  
Each team needs to record a match (2 minutes) of their robot and upload it to Google Drive. Videos will be shared with all Virtual GEAR teams. Organizers will provide feedback on scoring and possible game rule violations.
- 30 April: Deadline to upload Engineering Design Video:  
Each team needs to create a video in which they explain their engineering design process and game strategy. They need to explain which tasks their robot will attempt to complete and how they designed their robot to do so (max. 5 minutes duration). The video needs to be uploaded to Google Drive and will be share with all Virtual GEAR teams.
- 1-7 May: Game Day:  
Robots compete at the same location where teams practiced. An independent referee will attend the competition either in-person or via live video-conferencing. The performance of the robot will be recorded and uploaded to Google Drive. Scoring will be performed locally and will also uploaded. The organizers will Each team plays 2 matches and the match with the higher score will count.
- Second week of May: Announcement of awards for Virtual GEAR Challenge  
The following components count into the Award score:
  - Game Day Score
  - Quality of Engineering Design Video
  - Consistency between game strategy explained in Engineering Design Video and robot performance

## **Competition Categories**

Participation in both categories is limited to learners 14 years old or younger by the end of the competition (first week of May). The sequence of events is the same for both categories.

### ***First Timers:***

None of the team members has ever competed in a LEGO robotics competition (e.g. FLL, WRO, GEAR, etc.). This category provides an encouraging and non-threatening environment for learners who are new to robotics. All robot design and competition

runs will be performed locally and will be video recorded. Scoring is performed for each team individually.

***Global Competitors:***

This category is designed for teams that want to interact with teams from other locations during the competition. Participants with prior LEGO robotics competition experience are welcome to this category. After trial run, each team forms an alliance with a team from a different location. The alliance then must split the challenge tasks between the two teams. Teams in an alliance need to communicate via digital media (WhatsApp, Email, Skype, phone call, etc.) to decide on a joint game strategy. The Engineering Design Video must be submitted jointly by the alliance and must have contributions from both teams and describe which team will attempt to perform which competition task. During Game Day, the alliance competes jointly, each team at its own location, and will receive a joint score.

**Registration**

Register online at <https://goo.gl/forms/uGEol8yv1eWbtTPO2>