Gaining Traction on Mars Challenge - Competition 2020

INVENTORcloud Program's **Gaining Traction on Mars Challenge - Competition 2020** is designed to engage students' excitement, ingenuity, and creativity and challenge their understanding of science, math, and language arts through standards aligned learning modules. Competition 2020 eliminates barriers to previous Competition participation and Competition 2020 goes international this year! Watch this video to see first-hand how this program impacts students and teachers. https://youtu.be/fz8D-9-amvc

Challenge Rovers must navigate the simulated Martian landscape - slopes, tracks, sand and rock filled beds - competing against target performance requirements and other teams. Teams will address speed and velocity, traction, friction, and torque to optimize Rover performance through their design and production of the Rover's wheels, tread design, and gear ratios. Wheels are 3D printed; gears are 3D printed or laser cut. INVENTORcloud's Maker Space can assist with production needs.



Gaining Traction on Mars Challenge includes standards alingned learning modules designed to reinforce STEM and problem based learning through their inclusion into classes and curriculum currently used by participating schools.

Mars Rover Challenge Competition 2020 Components

Classes wishing to compete in the 2020 Challenge are encouraged to hold class competitions, using the Competition 2020 Components below, to select their class submission for Competition 2020. Each class can submit one (1) Rover for Competition 2020. There are two divisions: high school (grades 9-12) and middle school (grades 5-8).

The submission is comprised of the Rover with chosen wheels, gears and instructions and the video. INVENTORcloud staff will run the Rovers on each competition track and compile performance data. Teams will compete against established target minimum performance requirements, receiving bonus points for exceeding the target requirements. Teams must decide whether to emphasize speed or torque, to adjust wheels or gears or both, in order to maximize their Rover's performance for each trial. Wheels and gears can be changed for each of the three track conditions to optimize performance, if desired.

Rover Performance Trials:

1. **Horizontal Competition Track** with sand and rocks optimized for velocity and tread design.
2. **Inclined Competition Track** with a flat surface optimizing velocity, friction, and torque in order to pull a 6 oz weight up an inclined slope.
3. **Incline Competition Track** with sand and rocks optimized for velocity, tread design, and maximum grade.

Teams will be permitted three (3) trials on each track and the Team Rover Performance Score will be the average the three results.

Presentation Video: Each Team entry must include a presentation video. The video will include an introduction of team members, discussion of team's project performance and explanation of the steps taken to optimize the Rover's performance. The video will show the Rover demonstrating its best performance for each of the tracks. The team must share what they learned and how they worked as a team. The video will be scored on the quality of the presentation and its content. Video Performance Score will be added to the Rover Performance Score and count for 15% of the total for the final Competition 2020 Score.

Videos and Mars Rovers must be submitted by May 4, 2020. Competition 2020 will be held on May 11th-13th, 2020. Competition 2020 will be broadcast live on the Internet along with a Challenge Leader Board to all participating schools; scheduled times will be coordinated with participating schools. No travel is required, no transportation expenses, no testing conflicts and no one will miss a day of school! Minimum performance requirements along with official Competition 2020 rules will be posted.

Questions may be submitted at this site. All questions submitted, answers or clarifications and updates will be posted. Register to participate at www.inventorcloud.net/gtm-2020/

Cost to participate in the Challenge 2020

Schools enrolled in INVENTORcloud Program

- Program materials and professional development are included in annual INVENTORcloud Program subscription. Kits not included (see below).

Schools not enrolled in INVENTORcloud Program

- $600 per class for the 2019-2020 school year which includes standards aligned curriculum, CAD tutorials, option for INVENTORcloud Maker Space (includes materials and shipping) to produce wheels and gears, real time technical assistance and class instruction on CAD design tutorials.
- $350 for professional development which is recommended for first-time teachers or as a refresher.
- Kits not included; see below.

Mars Rover Kits

$75.00 per reusable kit. Participants must use the official Mars Rover Kit. Schools which purchased kits during the 2018-19 school year may use those kits; replacement parts are available for purchase.

Prizes and Incentives

$100 credit from INVENTORcloud Program for 2020-21 for classes participating in Challenge 2020.
First Place: Winning team in each division will receive use of the INVENT3D Printer rotating award for school year 2020-21 inscribed with their school name and winning year.
Second Place: $500 credit for use at INVENTORcloud for the 2020-2021 school year will be awarded to the second-place teams in each division.
Third Place: $250 credit for use at INVENTORcloud for the 2020-2021 school year will be awarded to the third-place teams in each division.