STEM Wars 2025

DIDI 500 – Design It! Build It! Race It!

Rules and Judging Criteria

Event Coordinator:

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- Please contact him with any questions.

General Overview:

- **What is the DIDI 500?**
  - **Design It! Build It! Test It! Race It!**
  - Competing in teams of four, students from area middle and high schools design, build, test, race and market a rubber band powered car. The students have a designated amount in their budget for the project. Students test and tweak their cars before the final race in an effort to create a polished, marketable final product. Engineers from local manufacturing facilities are on hand to provide technical support. If a team wants to purchase the expertise of the engineer they can do so. Following the car race, students are given time to create and present their design concept. The presentation board will include a sketch and brief explanation of their design and a summary of their project costs.
  - Teams must be composed of four students from the same school district. If your team has fewer than 4 students, your team will be paired with another team with fewer than 4 students at the event.
  - Schools may have several teams.
  - There will be a 1st, 2nd, and 3rd place winner.

Challenge 1: Design, Build & Create (Innovation & Design)

- Student teams apply Science, Technology, Engineering, and Math (STEM) skills, budgeting, teamwork, marketing, and creativity to design, build, test, race, and market a self-propelled model car.
- Each team will be given some 'basic manufacturing supplies' to use towards the creation of their car.
- Students are given $100 in 'DIDI Bucks' to purchase materials at the "DIDI Manufacturers Supply Store" to create their cars.
- Student teams will be given a list of available materials with pricing to help them use their budget wisely. Students are welcome to look at materials at the DIDI Manufacturers Supply Store while designing their cars.
- A variety of materials will be available to build, design, and propel the car. Some materials will be more effective than others to use, so getting to the DIDI Manufacturers Supply Store early is key to getting the best stuff! **That is why watching the videos and having a few ideas for the car design before the event is crucial.**
- No outside materials can be brought into the event. Students can only use the materials given to them or available through the DIDI Manufacturers Supply Store.
- Teams may also use their 'DIDI Bucks' to hire the consulting services of Manufacturing & Design Engineers during the event itself.

Challenge 2: The Race (Vehicle Performance)

- DIDIWNY will provide a measured track that will be used to determine the distance achieved by the car. The best distance from among the heats will be used for final judging.
- The race consists of 1 practice heat and then 2 heats for best distance, allowing students to troubleshoot in between.
- At race time, the vehicle will be placed behind the starting line with all its wheels in contact with the ground. No more than two team members will be allowed in the start area.
- At least one but no more than two members must wait at the end of the track to retrieve the vehicle after the distance is measured.
- Team members may not accompany or touch the vehicle while it is on the track before it is measured.
- Measurements will be made from the front of the start line to the front of the vehicle at the end of the heat.

Challenge 3: The Project Board

- Build a project board at the event. DIDI will provide you with the material. The project board should consist of the following:
    - Explain your design concept and why you designed it the way you did.
    - Capture and list data from each trial and race heat.
    - Explain any modification you made to the vehicle after each trial and race heat.
    - Summarize your project budget.

EVENT TIMELINE:

Start time 15 minutes	Teams arrive for introduction to the event. Directions are given and questions answered. Teams view the materials available at the store. Teams then report to their tables.
20 minutes	Teams develop a concept design and budget, then shop for their materials. When shopping is complete building can begin.
70 minutes	Teams build / test / revise their cars, and can return to the store for more supplies. As testing and revisions near completion, teams can start working on their presentation board. Teams can test their cars on the track before the official start time of the trials.
15 minutes	Race trial 1. Order of trial will be alphabetical by school.
15 minutes	Reiterations. Final adjustments to presentation board.
15 minutes	Race trial 2. Order of trial will be alphabetical by school.

Final Scoring: Teams will be graded on each of the criteria from a point range of "Basic" to "Exceptional." Teams will be judged on the criteria below:

- Innovation/ Design
- Project Board
- Teamwork (Teamwork consists of assigning roles to each team member, collaboration, budget use. For example, each team may have a design and sketching leader, a bill of materials (purchasing) leader, a supervisor and an assembly leader)
- Performance (Performance is determined by distance traveled by car)

Prizes: Awards will be given to 1st, 2nd, and 3rd place winners for. In the event of a tie, the team whose car traveled the furthest distance will be declared the winner.

One 'DIDI Spirit' award is given to one team that displays excellent sportsmanship as voted on by the judges.

Tips:
Before the event, students are encouraged to work with their team members and teachers to research various self-propelled car designs and how to create an elevator speech. Teams will be given a list of materials before the event providing time for the teams to think ahead and get your creative STEM juices flowing!

Here are some helpful links to get you started:
https://www.scientificamerican.com/article/build-a-balloon-powered-car/
https://www.youtube.com/watch?v=TehQqDH9j5w
https://www.youtube.com/watch?v=_Nh1mkm9y2I
https://www.youtube.com/c/GrandadIsAnOldMan (This site has a LOT of fun ideas!)
https://www.instructables.com/Propeller-Powered-Car/
https://www.sciencebuddies.org/science-fair-projects/project-ideas/Phys_p099/physics/balloon-powered-car-challenge
https://www.youtube.com/watch?v=b7zWwo9dbiU