

2013 Colorado Regional Lithium-Ion Battery Middle School Car Competition

1. Competition Structure

1-1. Speed Race

The race will take place on a 20-meter track and will consist of three time trials. The top 16 teams from the time trials will advance to the modified double elimination.

Awards are given to the top three fastest teams in the modified double elimination.

2. Car Materials

- 2-1. A teacher and student car kit will be provided to registered schools.
- 2-2. Materials from the student kit that must be used include:
 - E-flite 3.7V 150 mAh, 12c, Lithium Polymer Battery
 - Mabuchi 280 motor
 - Battery connector: model PKZ3052
- 2-3. Motors may not be re-wound or disassembled.
- 2-4. Any other batteries or motors may not be used in the competition.
- 2-5. Only one battery and one motor are allowed per car.
- 2-6. An on/off switch must be incorporated into the car design. The switch may be purchased or crafted from readily available materials such as aluminum foil, paperclips, fasteners, etc. Teams will be allowed to use the on and off switch that was included in the teacher kit.
- 2-7. Each vehicle will be inspected prior to the race. The inspectors will verify that the battery and motor are the approved materials. Also, they will be checking the dimensions of the vehicle.

3. Race Specifications

- 3-1. The vehicle cannot exceed the following dimensions: 20 cm wide by 40 cm in length.

- 3-2. A decal with a car number and sponsor organizations (provided at the regional competition) must be applied and visible from the side, top or front of the body of the car. An 8.5 x 2.5 cm space must be left for the assigned car number and sponsors.
- 3-3. The vehicle must be designed to carry a payload of 1 full cylindrical salt container: height: 13.5 cm, diameter of 8.3 cm, and mass of 737g (+ or – 1%).
- 3-4. The salt container may not be part of the vehicle's structure and must be easily and rapidly removed or reinserted. The following materials are examples of items you can use to hold the salt container on the chassis: rubber bands, string, zip-ties, structured compartment, etc.
- 3-5. Velcro, tape, or any other adhesive cannot be used to secure the container.
- 3-6. The salt container will be supplied at the starting line and must remain unaltered. The salt containers will be reused for each race.
- 3-7. If the salt container falls from the vehicle during the race, this will result in a Did Not Finish (DNF).
- 3-8. Energy Source: Teams will need to bring their own batteries to the competition. Electricity to plug in the battery rechargers will be available and located in the impound/repair area.
- 3-9. Steering: A guide wire attachment, referred to as an eyelet, must be attached to the car. This is the only allowable method of steering the car.
- 3-10. A guide wire made of fishing line will be no more than 1.5 cm above the surface of the track. This guide wire will go through the attached eyelet(s) on the car, serving as the steering mechanism, and keeping the car in its lane. (See Appendix A)
- 3-11. The vehicle must be easily removed from the guide wire without disconnecting the guide wire.
- 3-12. Lane changing or crossing will result in a DNF.
- 3-13. If a car is interfered with during a race it will be allowed an additional opportunity to run.
- 3-14. Track Dimensions: The track is a black neoprene rubber material. It is 20 meters long by 60 cm wide on a flat surface.

4. Race Conduct

- 4-1. There will be a repair table set up to help facilitate quick repairs to the cars. Teams that are scheduled to race in the next heat will be given priority in the repair area.
- 4-2. At race time, the vehicle will be placed behind the starting line and all wheels must be in contact with the ground. No more than two team members will be allowed in the start area.
- 4-3. Teams will have ONE minute to prepare their car at the starting line.
- 4-4. An early start or push start will result in a DNF for that heat.
- 4-5. All vehicles will start when the official signal is given.
- 4-6. The judges will note the official time on the heat card (See Appendix B). If the car does not finish the race, it will be noted as a Did Not Finish (DNF) on the heat card.
- 4-7. If the car does not finish the race within 40 seconds, it will be noted as a DNF.
- 4-8. At least one team member, but no more than two, must wait at the finish line to catch the vehicle upon completion of the race.
- 4-9. Team members may not accompany or touch the vehicle on the track. Vehicles stalled on the track may be retrieved after the end of the race has been declared by the Lead Judge.
- 4-10. **Students must not walk on the track!**
- 4-11. The vehicle and team member(s) must remain at the finish line until the time of the race has been noted either by the electronic timing system or on the heat card.
- 4-12. Challenges must be made before the race judges begin the next heat.
- 4-13. All challenges must come from the team members who are actively competing, not coaches, parents or coordinators.
- 4-14. All challenges must be directed to the lead judge. Decisions of the race judges are final.
- 4-15. Only competing students and race officials may be in the race area. All others including coaches, parents, mentors, coordinators, and non-competing students

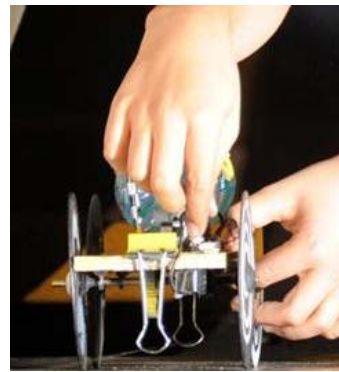
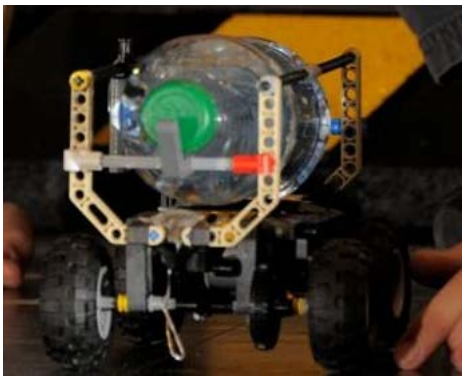
must remain in the spectator stands through the duration of the races. Teams will be disqualified if the coach interferes with the race.

4-16. Judges may inspect cars at any time before, during, or after heats.

5. Awards

Awards will be given for the three **fastest** cars and for the three best **designs**.

Appendix A.



Electric Car Competition



Car #1

Sample Middle School

Team: The Tigers

Time Trial	Heat	Lane	Time	
1	A	1	5.05	Fastest Overall Time: 5.05
2	F	6	5.33	
3	K	4	5.25	

Round	Heat	Lane	Time	
1				Fastest Overall Time: <div style="border: 1px solid black; width: 100px; height: 40px; margin: 0 auto;"></div>
2				
3				
Finals				