

Electric Car Stop

Name:

Block:

Objective

To design and build a motorized car, powered solely by the energy of two standard AA batteries, that will stop as close as possible to a finish line located 5 m from the starting line.

Construction Rules

- The car must be powered by two Energizer Max AA alkaline batteries which will be provided on the competition day.
- The car must be designed and built by the team. Pre-manufactured cars will not be allowed. Device components and parts from toys or other sources may be used.
- The car cannot have any additional potential or kinetic energy at the start other than what is stored in the battery.
- The vehicle must have at least 3 wheels. A wheel is defined as any object that can rotate about an axis and makes contact with the floor at all times.
- The propulsion of the car must be a direct result of Newton's Third Law of Motion between the floor and the wheels of the car. In other words, no part of the car may push (or pull) off any surface other than the floor beneath the car.
- The car must have a single activation switch, such as an electrical switch or a mechanical release lever, which starts the motor.
- All parts of the car must remain with the car as it travels down the track and stops.
- The car must be self-starting and may not receive a push in the forward direction or side direction.
- The car must be fully autonomous after it leaves the start line.

All students must exercise caution when working with tools of any kind. Personal protective equipment must be worn when using tools and must only be used under the direct supervision of a teacher or parent. Safety procedures and instructions for each tool or piece of equipment must be reviewed and followed at all times.



Figure 1: Energizer Max AA alkaline batteries. Two batteries will be provided on the competition day.

Car Testing

1. The car must be registered on the competition date. All cars will be inspected to ensure that all contestants have met the construction rules.
2. The course will be approximately 8 meters long and approximately 2 meters wide.
3. The starting and finish lines will be marked using tape.
4. The finish line will be defined as the rear edge of the finish-line tape, meaning the edge closest to the starting line.
5. The car will be started from rest with the entire front axel on or behind the starting line.
6. The car will be started using a single switch.
7. After the car has come to a complete stop, the distance from the finish line to the point of contact between the wheel farthest from the starting line and the floor will be measured
8. Any car that goes out of bounds before stopping will receive a score equal to a car that stops 200 cm or more from the finish line.
9. Each car will complete two runs. The better of the two runs will be recorded.

Scoring

Cars will receive a grade based on either the distance from the finish line or placing among all contestants, whichever is higher.

Distance (rounded up)	Grade
5 cm	100
10 cm	99
15 cm	98
20 cm	97
25 cm	96
30 cm	95
35 cm	94
40 cm	93
45 cm	92
50 cm	91
55 cm	90
60 cm	89
70 cm	88
80 cm	87
90 cm	86
100 cm	85
120 cm	84
140 cm	83
160 cm	82
180 cm	81
200 cm	80
>200 cm	70
Out of Bounds	70
Rolling Chassis ¹	50
Disallowed Cars ²	<50

Place	Grade
1st	100
2nd	98
3rd	96
4th	94
5th	92

¹ A rolling chassis that meets all design requirements (excluding motor) and rolls 2.5 meters with a reasonable push earns a 50.

² Cars that do not meet design requirements are scaled between 0 and 50. A car that stops within 5 cm earns a 50; a car that stops within 200 cm earns a 40; a car that travels out of bounds earns a 35; a rolling chassis or car the needs assistance starting earns a 25.