Name:

Physics 11
M. Lam

Mousetrap Car

Block:

Objective
To design and build a vehicle, powered solely by the energy of one standard-sized mousetrap that will travel the greatest linear distance.

Construction Rules
- The car must be powered by a single Victor brand mousetrap (1-3/4 inches × 3-7/8 inches).
- The mousetrap trigger mechanism must be used to start the car, and the mousetrap must not be disassembled or modified except as required for mounting to the car.
- The spring from the mousetrap cannot be altered. Do not double wind the spring.
- The spring cannot be wound more than its normal travel distance of 180 degrees.
- The car 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 car cannot have any additional potential or kinetic energy at the start other than what can be stored in the mousetrap's spring itself.
- 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.
- 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 if 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: Victor-brand mousetraps

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 the length of the hallway and approximately 4 meters wide.
3. The car will be started from rest with the entire front axel on or behind the starting line.
4. The distance traveled will be measured from the starting line to the point of contact between the wheel farthest from the starting point and the floor.
5. Any car that contacts the wall before coming to a complete stop will have its distance traveled measured from the starting line to the contact point with the wall.
6. 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 travelled or placing among all contestants, whichever is higher.

Distance (rounded down)	Grade
20 m	100
19 m	99
18 m	98
17 m	97
16 m	96
15 m	95
14 m	94
13 m	93
12 m	92
11 m	91
10 m	90
9 m	89
8 m	88
7 m	87
6 m	86
5 m	85
4.5 m	84
4 m	83
3.5 m	82
3 m	81
2.5 m	80
<2.5 m	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 mousetrap) 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 travels 20 meters earns a 50; a car that travels minimum earns a 40; a car that travels less than minimum earns a 35; a rolling chassis or car the needs assistance starting earns a 25.

One bonus point will be awarded for every 2 meters traveled in excess of 20 meters. Bonus points are awarded only to vehicles that meet all specifications.