

# *Mousetrap Racecar Project*

## **PROJECT OBJECTIVE**

Build a vehicle powered **entirely** by the energy of one standard sized mousetrap that will travel 30 feet, and stop, with the greatest accuracy.

## **PROJECT RULES**

1. The car is powered by one Victor brand mousetrap (about  $1\frac{3}{4}'' \times 3\frac{7}{8}''$ ). This is *not* a rat trap! Victor mousetraps sold for \$1 in the physics classroom or about \$2 at a hardware store.
2. The mousetrap cannot be physically altered except for the following:
  - A. Holes can be drilled in the wood base to mount the mousetrap to the car frame.
  - B. The spring can (and should) have a lever arm attached to it.Note: the spring from cannot be altered in any other way (like adding more coils).
3. No purchased mousetrap car kits allowed. Everyone will know you bought it, so don't do it!
4. No use of Legos, K-nex, or any part designed *specifically for the purpose of making a car part*.
5. The device cannot have any additional potential or kinetic energy at the start other than what can be stored in the mousetrap's spring itself. No extra springs, rubber bands, elastic, ramps, etc.
6. The mousetrap must be contained in the car and must propel the car by means of a wheel or wheels in contact with the ground. A launcher or device that pushes the car from a stationary object is prohibited.
7. The spring cannot be wound more than its normal rotation angle of 180 degrees.
8. The car must be started from a standstill by releasing the mousetrap spring in a manner that imparts no additional energy to the vehicle (i.e., the vehicle may not be given a push start in the forward direction or side direction.).

## **RACECAR PRE-COMPETITION CHECKPOINT (10 points) - due on Friday May 31<sup>st</sup>**

Your group's racecar needs to be functional BEFORE the competition deadline. Submit via email a video that shows your racecar can go at least 15 feet for full credit.

## **COMPETITION! (15 points) - Monday June 3<sup>rd</sup> and Tuesday June 4<sup>th</sup>**

1. The racetrack will be on the smooth floor in the classroom or hallway. Each tile is 1 foot.
2. Each group will have three attempts. The winner will be the car that has the closest trial on any one of the three attempts. Any ties will be decided by the comparing the three trials.
3. The front axle on each car will be reference for the start line and the finish line.
4. The distance the racecar veers off the centerline of the racetrack will be added to the distance your racecar is from the finish line. For example, a car goes 28.5 feet but veers 2.5 feet left, so your final distance from finish line is  $1.5 + 2.5 = 4.0$  feet

## **QUALITY OF RACECAR (15 points)**

1. How well is the car designed? Is it easy to operate? Does it go straight? Does it have a braking mechanism? Is it unique?
2. How durable is the racecar? Will it last for many years as an example for others? (5 points)
3. How consistent is the car? Can the results be repeated many times? (5 points)

## **RACE CAR POST-COMPETITION DISASSEMBLY (10 points) - due by Friday June 7<sup>th</sup>**

Your racecar must be fully disassembled and all parts brought back to the classroom. This "reuse and recycle" process is mandatory (unless the teacher excuses you) and allows for other groups to use the parts next year.

