

Physics AP, 470
Project #3:

Title: Potential Energy Cars

Purpose: The purpose of this project is to design a vehicle which uses the spring energy from a mouse trap as its source of power. The goal is to pull a sled of weight with your vehicle at least 5.0 m. Points are awarded based on how much mass your car can pull. Each individual student will construct their own vehicle. Each mass will be tested 2 times in the vehicles. All vehicles must be 100% Ready Before the day of Test. No time will be given on the test day to work on your car.

Materials:

You must use only a mouse trap as your source of power. An additional power sources (springs, motors, etc) will result in a grade of **ZERO** for vehicle construction and testing.

You **may not** use the following items:

Wood / Cardboard (Balsa is allowed) \ KNex parts \ Lego parts \ CD's \ LP's

Goals:

You **MAY NOT** use pre-designed kits

Your vehicle can be no wider than 0.3 m (30 cm) and no longer than 0.5 m (50 cm)

Your vehicle must drive along the floor. No flying or jumping.

Your vehicle only uses one mouse trap

Your vehicle must be able to reset for additional runs in less than one minute.

Your vehicle does not fall apart during testing

Your vehicle uses some simple machine (Pulley/Gear, Lever, etc.) to translate the force into motion.

Points:

(5 Points) The vehicle is only constructed with one mouse trap.

(5 Points) The vehicle is no longer than 0.5 m or wider than 0.3 m

(5 Points) The vehicle consists of at least one simple machine

(5 Points) The vehicle can be reset quickly (less than 1 minute)

(5 Points) The vehicle drives along the floor

Testing:

(10 Points) The vehicle is able to drive at least 5.0 m successfully (No Load)

(20 Points) The testing vehicles will be ranked from 1st, 2nd, 3rd, etc based on their pulls. First place will be awarded 20 points, Second place will be awarded 19, etc. Each place back from first loses one point per place. Last place out of 16 cars will be awarded only 5 points based on this calculation. (Points Awarded = 21 – place) Tied Vehicles will be awarded the lowest position of ranking. (Example the lowest three are tied, they are all awarded as if in last place not 14th. Or 3rd, 4th, & 5th tied, all awarded as 5th.)

Individual Writing:

(10 Points) Write a one page summary of your construction goals and reasons for your design. This must include the spring constant for your mouse trap, the energy stored, and your estimate of how much mass you can pull.

Due **before** testing.

Due on: _____

(15 Points) Write two pages minimum with MLA citations on the topics of Energy / Power Transfer and Efficiency. Include calculations for your device. Provide current estimate of how much mass you can pull
Due **on testing day** of vehicles. Two book sources required.
(No Dictionaries, Internet Sources, or Textbooks)

Due on: _____ <--- Testing Date

(10 Points) One page summary of your results and all of your classmates. Be sure to determine the efficiency of each vehicle. **Data must be collected from all cars.**
Due **after** testing

Due on: _____