

The Mouse Trap Car Project

Objectives:

1. Build (**NO KITS!**) a mousetrap car to travel a minimum of 10 meters (research for plans).
2. Calculate the average velocity of the mousetrap car.
3. Apply Newton's three Laws to the operation of the mousetrap car.

Additional Honor's objectives:

1. To derive the formula to calculate the powered distance of their mousetrap car
2. To calculate momentum of the mousetrap car.

Teams:

1. Students will operate in teams of two.
2. If there is an odd number of students in the class, then one team of three will must take on the additional task of illustrating the centripetal forces on the arm of the mousetrap and the powered wheels.

Rules:

1. The usage of a kit is **not allowed** in this project.
2. A single, unmodified (no heat treating, double winding of the spring, etc) mousetrap is the **ONLY** source of power for the car.
3. Anything may be attached to the mousetrap to make it a car. **Rat traps can not be used**, I prefer that my students do not loose any appendages.
4. The mousetrap is the only item you may need to purchase, all other parts can be recycled.
5. The car can have a minimum of 3 wheels and a maximum of 4 wheels. Decide which wheels do or do not need friction and/or power.

Work Day:

1. Students work on and submit the mousetrap car's preliminary design (drawing), materials list and duties of each person on the team. **Daily Grade**
2. Students will derive a formula that determines the distance the car will travel while power is transferred to the wheels.

Run Day:

1. Students present a final report on the application of Newton's laws in poster form.
2. Students will have 3 chances for their car to cover the minimum required distance.
3. Students complete the data sheet for average velocity, acceleration and deceleration of the car

Grading Rubric:

1. Did the car move the minimum distance (straight line distance only)? 50 points
2. Do the math 20 points
3. Newton's laws application (1/2 size poster) **Neatness and quality matters!** 30 points
Your poster will contain:
 1. Three free-body vector/force diagrams of the mousetrap car, one for each of Newton's laws
 2. Identify, define and show how the law applies to the respective diagram.
 3. Each diagram will include vectors that show the direction of the forces that applies to the mousetrap car for the law in question. Label the force vector.
4. Mousetrap car design (sketch), materials list, and respective duties (daily grade) 100points

NO KITS!

**Usage of a kit for your car will result in a 50% reduction in grade.
Yes, I am familiar with the available kits.**