

Mousetrap Race car Project

Due Date: Dec 4th

INTRODUCTION

The mousetrap car shows how energy can be transmitted from one location to another to accomplish some form of work. In this activity you will design and build a vehicle that is propelled an undetermined distance when the arm of a mousetrap is released transmitting the potential energy from the spring of the mousetrap to one of the axes. You will also submit a Lab Write up which will be a typed portion answering questions

This project is designed to give you the opportunity to apply several principles of physics. Motion, forces, friction, Newton's Laws, and energy transformation are a few of the many concepts that come into play. Be sure to consider these principles when designing and building your mousetrap- powered car. In your lab write-up, you will be asked to explain how these factors influenced your design.

Before you begin, read the rules carefully and think about what type of car you would like to build. The first attempt at designing the car will probably not be the one you end up building. So allow yourself plenty of time to design and begin building the car.

I encourage each of you to strive for excellence! Do not be discouraged if you need to make several modifications to your original design. The continuous process of refining a design is what science and engineering are all about! In the past, some builders have made so many modifications that they had to build a second car, spending about 16 hours in the total building process. Definitely, test your car several times throughout the building process. I also suggest waiting until you have a successful design before devoting a lot of time to your car's cosmetic appearance.

The next few pages illustrate some of the car's basic components as well as different design ideas. Pick and choose from these ideas or come up with your own! Remember, you can decide how to focus your efforts – speed, distance, and/or power. HAVE FUN!!

This paper will not give procedures for making the mousetrap car. Instead, it will list helpful hints and guidelines to follow while you are using your own creative and problem-solving abilities to make the mousetrap make your car go as far as you can!!!

MATERIALS

- 1 standard mousetrap
- kite string or fishing line
- Nuts, bolts, screws, wood, plastic, coat hangers, etc. basically, any items you care to use to construct the car.

GUIDELINES for the mousetrap car event

1. The mousetrap CAN be modified if you'd like to (i.e., clipping or bending the wire.)
2. Only the mousetrap can be used to propel the car (i.e., you can't add more springs.)
3. Either string or fishing line must be used to connect the trap to the axle (i.e., no rubberbands.)
4. Either axle may be used as the drive axle.

Helpful Hints

1. There are several videos and websites on how to make a mousetrap car. Search these videos for ideas.

YouTube: <http://www.cleanvideosearch.com/media/action/yt/search>
<http://www.cleanvideosearch.com/media/action/yt/watch?videoid=Sq--xk8Yk8g>

Websites: <http://www.instructables.com/id/Mouse-Trap-car/>

2. Prevent the drive axle wheels from spinning too rapidly. Otherwise, it will just sit there and spin and not go very far. A slow, continuous movement is better.
3. Make sure you have good traction (a lot of friction) between your wheels and the floor.
4. Axles need to spin freely. Don't rob yourself of power.
5. Make sure wheels are attached firmly to axle and the axle is firmly attached to the body of the car.

6. Bigger (in diameter) drive wheels will help.
7. Wind string or fishing line tightly when you prepare your car to go.
8. Insure that the string is not connected to the axle after it has unwound. (Otherwise it will catch the axle and stop your car.)
9. Make sure the wheels are aligned so that the car goes as straight as possible. You don't want it crashing into the wall.
10. Remember, bigger is not necessarily better. We've had super cars that weren't much larger than the trap itself!

GRADING

This project will count as a Test/Project grade with the following breakdown:

♦ Constructed car – on-time and complete	40 points
♦ Checkpoints	10 points
♦ Car travels every meter up to 5 meters(2 points every meter)	10 points
♦ Lab write-up – on-time and complete	40 points

Total points	100 points
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Mousetrap Racecar Write-Up

Due Dec. 4th

This is a cumulative look at many of the physics concepts we have covered this semester. Your task is to make your explanations as clear and to-the-point as possible so there will be no doubt in my mind that you know what you're talking about. I expect you to use the vocabulary we have discussed in class rather than vague, everyday language.

TOPIC #1: Newton's Laws

State each of Newton's Laws and explain how each law applies to the motion of your racecar. Consider the forces involved during the beginning, middle, and end of your racecar's run.

TOPIC #2: Conservation of Energy

Describe how energy was conserved during your racecar's run. How were potential and kinetic energy involved? Which forms of energy were involved and how? (See your notes or textbook for the different forms of energy.)

TOPIC #3: Summary

Summarize what you learned through the process of building and racing your racecar. Be sure to discuss any problems you encountered and how you solved them. What were your car's strengths and weaknesses? What changes would you make to your car in the future and why?

Mousetrap Car Project Agreement

DRAWING/MATERIALS/
PROTOTYPE CAR
COMPLETED CAR
WRITE-UP

Due Date: Friday Nov 13th
Due Date: Friday Nov 20th
Due Date: Friday Dec 4th
Due Date: Monday Dec 7th

Must be signed and returned by Friday, Nov 13th

I have read and understand this assignment. I understand that there will be no late projects accepted.

Student signature _____

Parent signature _____

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