

Mousetrap Race car Project

Due Date: \_\_\_\_\_\_\_\_\_\_

# 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 axles. 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 writeup, 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.

The weblinks below 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. Only the mousetrap can be used to propel the car (i.e., you can’t add more springs.)
2. Either string or fishing line must be used to connect the trap to the axle (i.e., no rubberbands.)
3. 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:   
   [How to make a Mousetrap Car Cheap & Easy Tutorial (Fast & Long distance) - Science Project - YouTube   
   https://www.youtube.com/watch?v=kPAyIXwryaI](How%20to%20make%20a%20Mousetrap%20Car%20Cheap%20&%20Easy%20Tutorial%20(Fast%20&%20Long%20distance)%20-%20Science%20Project%20-%20YouTube%20%20https://www.youtube.com/watch?v=kPAyIXwryaI%20)  
   [How To Make A Mousetrap Car - YouTube](https://www.youtube.com/watch?v=SV0Y1LSRrfQ)  
   https://www.youtube.com/watch?v=SV0Y1LSRrfQ

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

1. 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.
2. Make sure you have good traction (a lot of friction) between your wheels and the floor.
3. Axles need to spin freely. Don’t rob yourself of power.
4. Make sure wheels are attached firmly to axle and the axle is firmly attached to the body of the car.
5. Bigger (in diameter) drive wheels will help.
6. Wind string or fishing line tightly when you prepare your car to go.
7. Ensure that the string is not connected to the axle after it has unwound. (Otherwise it will catch the axle and stop your car.)
8. Make sure the wheels are aligned so that the car goes as straight as possible. You don’t want it crashing into the wall.

# GRADING

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

Constructed car – on-time and complete 35 points

Car travels every meter up to 5 meters (5 points every meter) 25 points

Lab write-up – on-time and complete 40 points

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Total points 100 points

**Mousetrap Racecar Write-Up**

Due Date. \_\_\_\_\_\_\_\_

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: Labelled diagrams.**  
You will need to submit a scientific diagram of your finished product. This should be done on blank A4 paper with a pencil and ruler. Detailed labels of materials should be included. A scale and measurements are to be included also.

**TOPIC #2: 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.  
You should have at least a medium-sized paragraph of text for each of the Laws.

**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?

**Due Dates**

**Construction** will take place over **Monday, Tuesday and Wednesday** of week 2.  
**Racing** will take place on **Thursday** of week 2.  
**Write-up** will be due and collected first thing **Monday** of week 3.