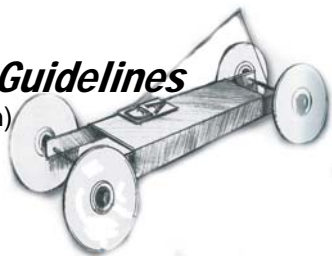


# Mousetrap Car Guidelines

Unit III (Force & Motion)



Name: \_\_\_\_\_

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

Period: \_\_\_\_

## Timeline

This project is due Tuesday, January 8, 2008

## Purpose:

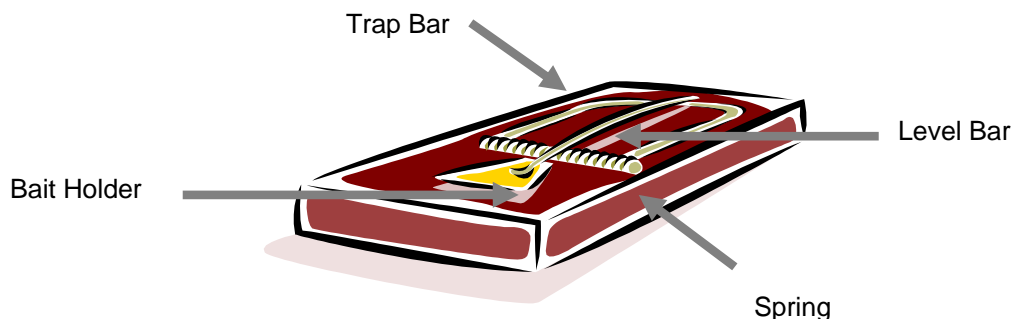
To provide the opportunity to use critical thinking skills in developing a solution to a specific problem in transportation technology.

## Problem:

To design and construct a self-contained, self-propelled vehicle powered by a single Victor mousetrap ( $1\frac{3}{4}$ " X  $3\frac{7}{8}$ ").

## Specifications:

The mousetrap must remain as purchased. This means that the *trap base* and *spring* cannot be altered in any way. The only acceptable alteration to the trap itself will be an *extension of the trap bar*.



The frame and wheels must be made from materials you have designed and assembled. Commercially made materials will not be accepted. However, you may engineer the frame and wheels from a variety of materials or everyday products. Materials would be such that they could be shaped, formed, or molded into parts that can be used as wheels. Examples would be:

## Acceptable Materials for Wheels & Frame:

- |                           |                                |
|---------------------------|--------------------------------|
| -Paper, Wood or Cardboard | -Small cans                    |
| -Stereo records           | -Rubber balls                  |
| -Compact discs            | -Lids from assorted cans, jars |

## Non-Acceptable materials:

- Metric 500 or model kit wheels (commercially made)
- Plastic model kit frames

**Overall Dimensions of the vehicle shall not exceed:**

Length: 24 inches (with the trap bar extended)

Width: 12 inches

Height: 18 inches (the height of the vehicle will be measured from the floor to the highest arc of the trap bar or any other portion of the vehicle).

**Racing Your Vehicle:**

- The track will be four feet wide. If the vehicle leaves the confines of the track, the distance will be marked where any part of the vehicle leaves the track boundary.
- The vehicle should be designed to stay within the four-foot track lane. The distance the vehicle travels will be measured from the starting line to the front of the vehicle. The objective of your design should not be *distance*, but rather *speed*. The distance of the track will be 5 meters (16.4 feet). You want to design a vehicle that will travel the 5 meters in the shortest amount of time.
- To start your vehicle, the trap must be set. A coin will be dropped on the bait holder. If coin or bait interferes with vehicle, that run will not count.
- Two runs per vehicle will be RECORDED and monitored. Those two times will be averaged and seeded along with everyone else in the class. Once time trials are completed all competitors will be placed according to their seed in a tournament style bracket.

**Mousetrap Vehicle Vocabulary**

Potential Energy	
Kinetic Energy	
Torque	
Force	
Momentum	
Friction	
Energy	
Design	
Trial/Error	
Engineering	
Balance	
Alignment	
Motion	
Aerodynamic	
Mechanics	
Improvise	
System	
Suspension	
Imagination	

## Mousetrap Vehicle Worksheet

Explain how you are supposed to use the mousetrap to power your vehicle.

Explain why you should lengthen or shorten the extension arm on the **mousetrap**.

Explain how **traction** and **friction** can affect how far your vehicle will travel.

Define **momentum** and explain how it can improve the distance your mousetrap vehicle will travel.

What is **potential energy**?

What is **kinetic energy**?

Use a mousetrap and a balloon as examples to explain these two energies.

### Mousetrap Vehicle Design

In the space below, draw your designs for your mousetrap vehicle. Be sure to label **ALL** parts. Below, make a list of **ALL** supplies you will need to complete your vehicle.

### Mousetrap Vehicle Grading Scale

Category	Points Possible	Points Earned
Mousetrap Vehicle Vocabulary	20	
Mousetrap Vehicle Worksheet	20	
Mousetrap Vehicle Design - Hand drawn design above - Creativity, Originality, Workmanship	25	
Mousetrap Vehicle Performance - Ability to move on its own -5 pts. for every meter it reaches	50	
Effort & Participation	35	
<b>Extra Credit</b>		
Fastest recorded time	10	
Winner of Tournament	10	
Most creative/original (voted by class)	10	
Best built vehicle (voted by class)	10	
<b>TOTAL POINTS</b>	<b>150</b>	