

# Mousetrap Car

For this project you will design and build mouse trap cars, test them and do calculations of speed, acceleration, and distance. Only the mousetrap provided can be used to power the cars, absolutely no other propulsion method should be used including rubber bands. Mousetraps are used to power the vehicles by attaching a string to the arm of the trap and then wound around the axel. Experimenting with size and length of all parts on the vehicle is encouraged. There will be two measured competitions, speed and distance, and at the end there will also be a competition on the class's favorite car judged by an anonymous vote. The vehicle must function correctly to win the unique competition. After the competitions, calculations will be made for speed, acceleration, and distance.

## **Building the Car**

The basic idea is to build a car that is propelled by attaching a string to a mouse trap and wrapping the other end around an axel so that when the mouse trap is triggered it will pull the string spinning the axel.

You will be provided the following:

- cardboard (if needed)
- scissors
- wheels
- wooden dowels for axels and lever
- safety glasses
- string
- framing for the base
- glue (Do not glue anything until it is in it's final placement! You will not receive extra materials!)
- mouse traps
- cutters (to cut lever on the mouse trap)

- Anything else you wish to use you will have to provide

There are key ingredients to make the mouse traps the best. All good engineers solve their problems with the end in mind. In this situation the end of the experiment is the kind of race you want the car to excel in. There will be two measured competitions, one is a speed competition, and the other is a distance competition. Modifying the length of the lever arm on the mouse trap will greatly change the performance of the vehicle. If you want distance lengthen the lever arm, but if you want to win the speed race a short lever arm is the way to go. If you are modifying the lever arm to make it longer, keep in mind that it must stay rigid. If the arm bends while it is in action, then energy will be taken from your outcome. Also, wheel size will affect the race. The larger your wheels are, the more distance will be traveled, but at the cost of speed. A common wheel to use for the cars is a CD. CDs are convenient because they are easy to find. CDs however have a large hole in the middle. The best way to solve that problem is by putting something (cardboard taped with a smaller whole) in the whole of the CD. You need to make sure that the axel can move freely. Also, you can add traction to the wheel.

Testing the car is extremely important; make sure the mousetrap is disarmed at all times until its ready to test. Testing can get a lot of the bugs out of a car. For example, one of the hardest things with mousetrap cars is steering, going straight doesn't happen without any effort. For speed cars you will want to find the best length for your lever arm.