

Turn a mousetrap into a teaching aid

The modern toys such as, Robosapien, Amazing Amanda, Furby are electronic base where it is used to keep us company. However, have we forgotten about the fun of making our own toys? The challenge is not about how to accessorise our toys but to understand how they work. Disassemble Furby and you will see plates with chips that control the movements and voice of the 'digital dog', we are just the end user of technology. We have lost the fun of creating. Do we look at the things around us as they are or could visualise their potential? Enabling the students to explore this, the Physics Department came up with a competition to build a car out of a mousetrap. Though not a very original idea, it was to open the students' mind to put their knowledge to use.

The students were given a task to build a mousetrap car that is solely powered by a standard size mouse trap. Limitation of minimum cost and no alteration on the mousetrap car was allowed. The objective was to come up with a design that will travel the furthest distance.

Take a look at a mousetrap, the main mechanism that makes it work is just a spring. It is such a simple design, yet effective in serving its purpose. As the steel wound around the trap, it stores its potential energy that waits to be harvested and put into good use. Harvest this energy and we can use it to propel a car.

However, there are many factors that need to be taken into account. The amount of energy that can be used is predetermined by the manufacturer of the mousetrap. Therefore there must be some investigation on how much work the spring can do. Then create a mechanism to maximize the energy to move the vehicle putting all they have learnt about friction, torque and generally mechanics into use. We need friction in order to make the wheels move the vehicle and not spin it only. However, too much friction stops the wheel as the force is not enough to drive the wheels. Then the torque as string is tied to the axle of the wheels to produce the propulsion. Extending the spring with a lever can increase the torque that acts on the axle.

The students also realized that the ratio of the axle to wheel will give the magnification of the distance produced as the lever unwinds the string that is wound around the axle. Determining the vehicle to be front driven or back driven, depends on the design and the distribution of weight of the vehicle. If it were to be front driven, the rear of the vehicle needs to be light to reduce the drag and the other round if the vehicle were to be back drive. The dimension of the vehicle determines the distribution of weight and the peripherals that can be attached to the vehicle, i.e. the lever that can be attached. The longer the lever, the length of the string attached can be lengthen and thus propel the car further. However, the length of the lever also affects the distribution of mass of the car. The wheels must have equal distribution of mass on the left and right side to ensure a perfect rotation of the wheel and this rotational inertia will help to ensure that the wheels can move in a straight line.

A very clever design won the competition. The pair of students used the aluminium railing from their window panes as the body of the car, compact discs were used as the tyre of the vehicle and the lever was made out of a clothe hanger. Although it was estimated that the car would have traveled 40 meters, the official record was only 29 meters due to space constrain as the car was stopped by the wall. This is definitely an activity to summarize mechanical physics which the students have learnt. At the end of

the whole activity, students were required to report on their designs and their trial in producing the ultimate mouse trap car. This activity also serves as an internal assessment for these students. The most important key to the activity is that they had fun and at the same time explore their knowledge to put it into good use.



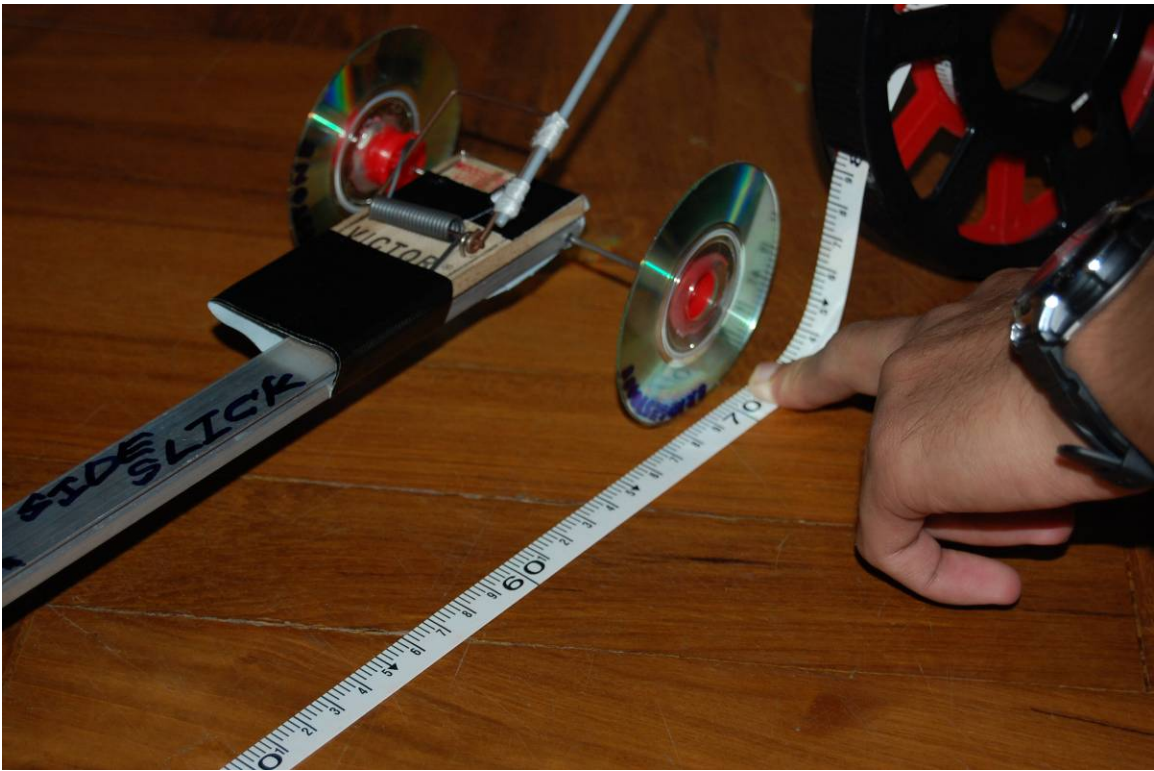
Participants releasing their dream car.



The farthest car in the school record.



Hope that this will beat the record....



Precision matters.....