YEAR 12 Task 8 Science Report

Lu Tha Say

**What are the two types of friction that affect the performance of your vehicle?**  
Rolling Friction – This was used in the wheels of the mousetrap car to help with distance.

Static Friction – This is what makes the car stable, so it doesn’t roll off, this was what was used in the weight of the car as it resists all forces an remains static.

**What problems related to friction did you encounter and how did you solve them?**  
Main friction would be air friction, we fixed it by making our vehicle aerodynamic so that air would travel through the car instead of pushing the car back. We made our base of the car flat so that air can easily flow through the car and the wheels were thin.

**What factors did you consider deciding the number of wheels you chose in your design?**  
The balance of the car was one of the important factors in determine the number of wheels, we had multiple concepts regarding the number of wheels but ultimately, we chose the 4-wheel concept with its ability for balance and security on the weight.

**What kind of wheels did you use in each axle? What is the effect of using large or small wheels?**  
We used large wheels with a very thin width, this was due to the CDs being very thin, but it was alright if they were straight and stable. We hot glued it to the axle of the car with bottle caps to support its stability and ease of attachment

**Explain how Newton's first, second and third laws apply to the performance of your vehicle.**  
Newtons first law applies to the experiment as the vehicle is powered by the string and it remains still until we released the stick attached to the string.

Newtons second is when force is applied to an object at rest it to accelerate in a direction of the force, This is when the string is released which is the force and it accelerates the axle with is attached to the wheels causing it to move.

Newtons third law is in every action in nature there is an equal and opposite reaction which is when force is applied to the axle from the string being released, the axle is pose as an object exerting equal force to the force that is being applied to the string, thus variables such as the wheel will spin due to the force being applied.

**Discuss the effect of the length of the lever arm in the pulling force of your vehicle.**  
Longer levers have less pulling compared to shorter lever arm but longer levers pull more string from the axle than the shorter lever . Changing the length of the mouse trap's lever arm is the number one way to control a vehicles performance in regards to its distance and weight.

**Discuss the types of energy transformations that occur in your car.**   
Mechanical to Kinetic - When we spun the wheel constantly into the axle of the car, there is potential kinetic energy which is considered mechanical energy and when we release the stick holding the string, energy is transformed into kinetic energy

Gravitational – Gravity is affecting the mousetrap car as it puts weight on the car and keeps it on the ground which can reduce distance.

**List the energy types that are wasted in your car.**

Heat – When the wheel is spun, the amount of force applied generates heat which is a wasted energy and unwanted in this experiment

Sound – When the mousetrap car started moving you could hear the CDs rolling on the concrete which isn't needed

**Discuss how you increased the efficiency of your vehicle (reduced the wasted output energy).**

We tried to reduce weight on the car so that gravitational energy is the pulling it down + the weight of the vehicle so we tried to reduce as much weight as possible on the car as it was the only one we can control, we made sure our axle was thin so that more movement is happening when force is applied