Task 8 Science Report

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**What are the two types of friction that affect the performance of your vehicle?**  
 The mousetrap car's wheels were equipped with rolling friction to help with distance.

Static friction was employed to weigh the car since it resists all forces and keeps itself static, which keeps it stable and prevents it from rolling off.

**What problems related to friction did you encounter and how did you solve them?**  
Main friction would be air friction, We were able to overcome the problem by making our car aerodynamic, which allows air to flow through the vehicle rather than pushing it back. We made the car's base flat and its wheels narrow so that air could easily flow through it.

**What factors did you consider deciding the number of wheels you chose in your design?**  
We considered a variety of wheel options, but ultimately settled on the 4-wheel design due to its capacity to balance and remain secure underweight. The stability of the car was one of the key elements in determining the number of wheels.

**What kind of wheels did you use in each axle? What is the effect of using large or small wheels?**  
 Because the CDs were so small, we had to use big wheels with a very narrow width, but as long as they were steady and straight, it was fine. To ensure its stability and simplicity of installation, we used bottle caps to hot glue it to the car's axle**.**

**Explain how Newton's first, second and third laws apply to the performance of your vehicle.**  
The experiment makes use of Newton's first rule since the vehicle is propelled by the string and remains motionless until the stick is freed from the thread.

When the string is released, which is the force, it accelerates the axle that is connected to the wheels, causing it to move. According to Newton's second law, when a force is applied to an object at rest, it causes it to accelerate in the direction of the force.

The axle is positioned as an object exerting equal force to the force that is being applied to the string, and the wheel will spin because of the force being applied, according to Newton's third law, which states that every action in nature has an equal and opposite reaction. This occurs when the string is released, applying force to the axle.

**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 regarding its distance and weight.

**Discuss the types of energy transformations that occur in your car.**   
Mechanical to Kinetic - Potential kinetic energy, which is what the wheel spinning into the axle of the car is considered, is converted into kinetic energy when the stick holding the string is released.

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 made sure our axle was thin so that more movement would occur when force was applied, and we attempted to reduce weight on the car so that gravitational energy and the weight of the vehicle were pulling it down. Since weight is the only factor we can control, we made sure to reduce as much weight as possible on the car.