Balloon Powered Car

[redacted]

Source: Student Image

Introduction: Defining the Problem

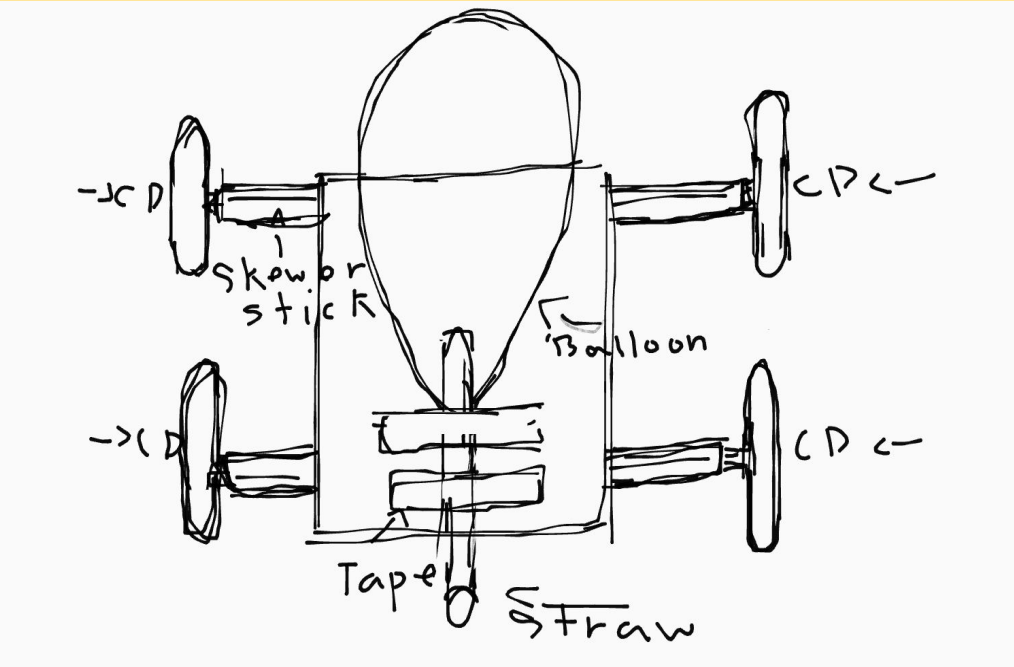
The problem I am trying to solve is how far can the car go with just using a balloon as energy to move the car. What would be the farthest distance it can can go with the energy from the balloon? It is important to use air powered cars rather than fossil-fueled powered cars because it is cheaper to produce air than it is to burn fossil fuels. There are less parts to use. For example: spark plugs, catalytic converters, and wires, which equals less maintenance cost. Air powered cars will not produce pollutants like carbon dioxide, either. Last but not least, they are more energy efficient than fossil fueled cars.

Renewable energy comes from natural resources like wind and solar power. Wind energy is a **renewable** energy source that converts the kinetic energy of wind to electricity. For my balloon car, I am using natural air to act as fuel to move the car in a straight motion.

Background Research

Newton's Third Law of Motion states that for every action, there is an opposite and equal force reaction. My balloon car project illustrates Newton's Third Law of Motion in that the action force takes place when you blow air in the balloon. When released, the balloon air moves the car in a forward motion. This force is called the ¨reaction Force.¨ This motion is what makes an object propel. In this case, it is a push force because the air inside the balloon pushes outward, and when it's released, the air that is escaping from the balloon pushes against the surrounding air, creating an opposite and equal reaction force that pulls the balloon forward. That air from the balloon acts as an energy force to fuel movement in the car.

Prototype Sketch



Source: Student Diagram

My Proposed Solution

For my Balloon Car project, my proposed solution would be to create a renewable energy car using wind in order to identify how air powered cars are more eco-friendly than fossil fuel or other battery powered cars. To do so, I will be attaching a balloon and straw to a cardboard base so that my car can propel forward while the balloon deflates.

Materials and Requirements

Materials

- Cardboard (1)
- CD disks (4) or, water bottle (4) caps
- Balloon (1)
- Straw (4)
- Putty (1)

Requirements

- Make the balloon air push the car in a forward motion.
- Make the balloon move the car in a straight line by using the air that´s blown into the it

Prototype Design

For my Balloon Car project, I used the balloon a piece of cardboard for the body. I used the balloon to push the air outwards to move the car. For the wheels, I used round CD disks, for the axel I used hole straws and skewer sticks inside the axle to help move the wheels. I used putty to hold the skewer sticks and CDs together. I used one extra straw to fill air inside the balloon

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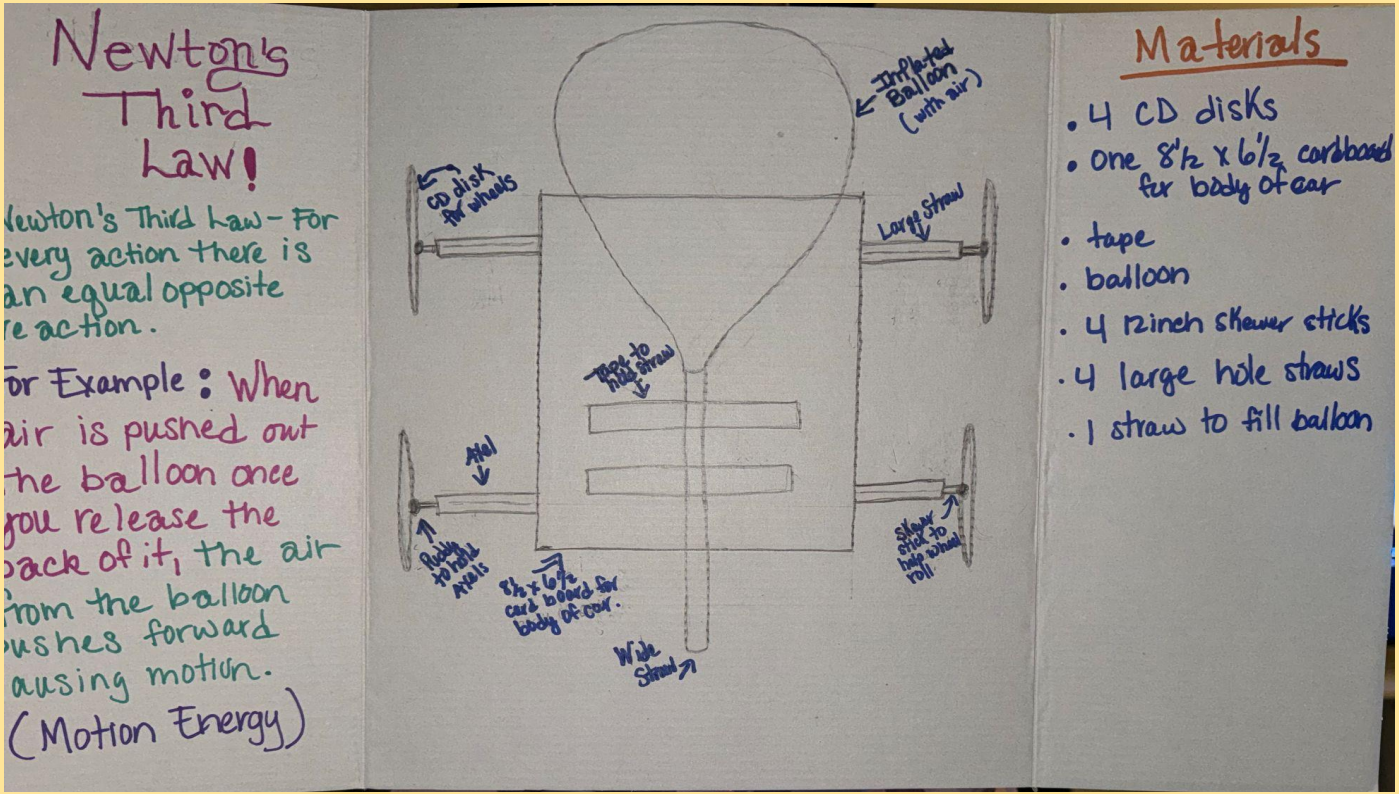
Prototype Diagram



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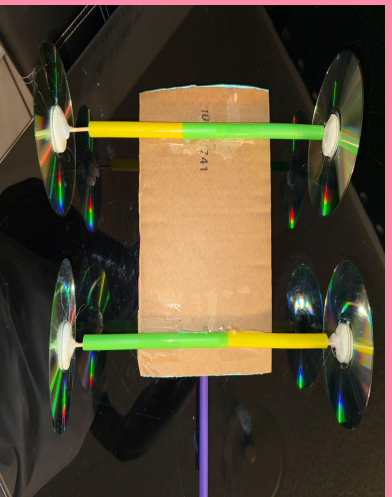

Source: student photo

Test Solution

The main components of my Balloon Powered Car are, for the body, cardboard is used. For the axles, which connect to the wheels, I used large straws and skewer sticks to attach to the wheels. I used tape to tape down the straws to the body of the car. I used a rubber band to tie the balloon and hold onto the straw. I used putty on the wheels, (CDs) to attach the axel. My balloon car successfully demonstrates the need for renewable energy by, using only the surrounding air, which is a natural resource.

Data

Quantitative

For the Quantitative data, the distance the car traveled was approximately 17 feet, starting from the hallway into the living room.

Time: The time traveled was, 11 seconds from the hallway to the living room.

Weight: 22 grams.

Air pressure: 0.8 PSI

Dimensions: The length of both axles are 12.5 inches. The width of each wheel is 4 inches wide. The length of the straw to blow the air is, 9 inches. The width of the balloon is 2 and a half inches.

Trials: I repeated my experiment more then 6 times.

Qualitative

For the Qualitative data,

Movement path: Car traveled in a straight line and did not curve.

Stability: The car was well-balanced and did not tip over.

Wheels/Axle: Wheels were able to spin freely and axles held the wheels very well.

Design: The design of the car is, rectangle with round wheels.

Friction: I observe that the car was moving smoothly on a tiled floor onto a carpet.

Data Table

	Distance (feet)	**Time (sec)**	**Speed (feet/sec)**	**Average Speed**
Trial 1	17 feet	11 seconds	1.54 ft/sec (based on calculations)	**Average speed = 10** **(4.21 ft/s divided 3) = 1.4 feet/sec**
Trial 2	15 feet	9 seconds	1.67 ft/sec (based on calculations)	
Trial 3	10 feet	10 seconds	1.0 ft/sec (based on calculations)	

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My Results

The results of my Balloon Powered Car demonstrates Newton's Third Law of Motion, which results in a vehicle that moves by the escaping air. I feel that my project succeeded what I was trying to show because I succeeded in building a model for a renewable energy car. What I would do differently next time is try to find less materials to use to build the car for environmental purposes. The less material, the better the environment.

Conclusion and Discussion

The problem my engineering project aimed to solve creating a balloon powered car with forward motion and speed. While building my prototype, some issues I encountered was the balloon car not using enough air**.** This could have affected my outcome by **not blowing enough air into the balloon.** If this project were to be repeated, I wouldn't do anything different because I like the way my balloon car came out. Overall, I learned that using natural resources for my balloon car will work better for the environment**.** My conclusion is that, my car will depend on using renewable energy, which is using natural resources like air from the environment to act as fuel.

Source: Google Image

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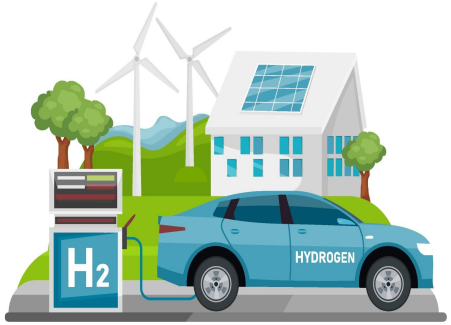
Implications

My project is important because it helps us understand future options for renewable energy. The results showed that it is possible to design a car that doesn't harm the environment. This information could be useful in daily life because my balloon car shows an eco-friendly option for transportation. People could use these results to find similar resources for a real wind-powered car that is beneficial for the environment.



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Future Engineering Ideas

If I could continue this project, I would use even more recyclable materials. One new question I have is what are appropriate eco-friendly materials that could improve my balloon car? In the future, I would improve my design by using different natural resources like solar rather than gasoline or a battery-powered car.. These changes would help me learn more about renewable energy and other natural resources that are better for the surrounding environment.

Source: Google Image

Works Cited

- Nasa Gov: https://www1.grc.nasa.gov/beginners-guide-to-aeronautics/newtons-laws-of-motion/
- Science Buddies: https://www.sciencebuddies.org/