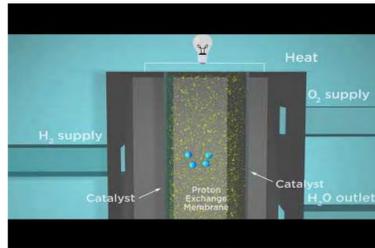


Hydrogen Fuel Cell Powered Vehicles

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INTRODUCTION

- Research study conducted on hydrogen fuel cell vehicles across 5-week period
- Hydrogen fuel cells:
 - Electrochemical devices
 - Potential to reduce greenhouse gas emissions by 55%-65%, when compared to gasoline in conventional vehicles(wells to wheels report)
- Combine hydrogen and oxygen to create electrical power



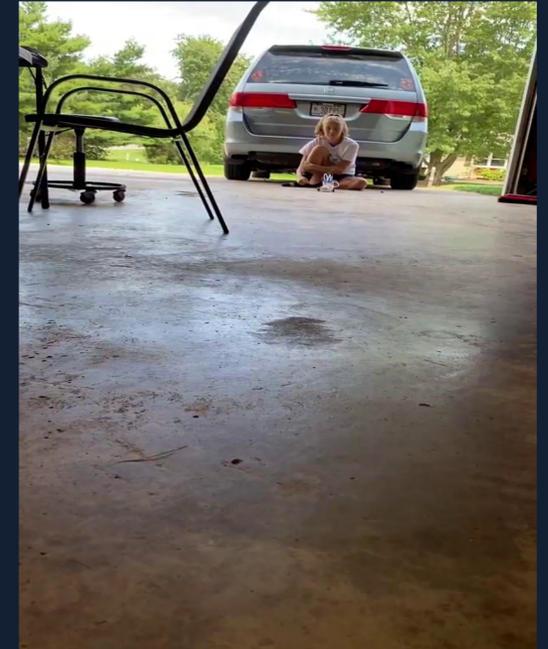
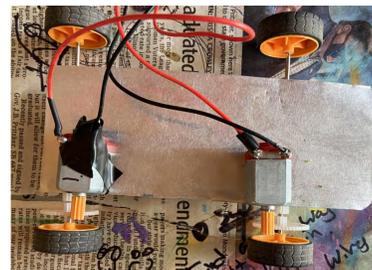
METHOD

1. Build a lightweight, low friction model car from CHEETA kit
 - Propellor vs. pulley system vs. gear system
2. Integrate one or more fuel cells for power generation
 - Identify which ratio of fuel cells to motors is ideal
3. Vary the setup to improve distance traveled
 - Measured distance on a flat low-friction surface
 - *measured speed by time trial for 20 feet

KEY RESULTS

- Our model car has a two axle structure with an aluminum base.
- We found that a gear system allowed the car to run significantly faster and longer than both a pulley or propellor structure. A gear was attached to the head of both motors, which turn another gear on the axle.
- Adjusting endurance and power(speed) has everything to do with the way you wire the circuit, creating more or less resistance and current.
- Power = volts² / resistance.

Wiring Setup	Speed(ft/seconds)	Distance(ft)
One fuel cell wired to 2 parallel motors	0.57	60
2 parallel fuel cells wired to 2 parallel motors	1.05	679
2 series fuel cells wired to 2 parallel motors	2.5	620



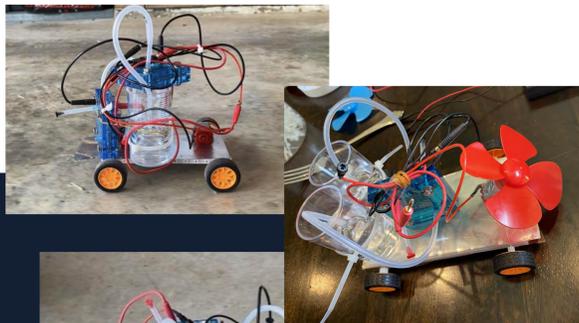
CONCLUSIONS AND FUTURE DIRECTIONS

. Since our original goal was to make a vehicle that had the most endurance, the all parallel wired option was our final model. Lastly, we hope to take the ideas we have formed and use them to help make aircraft run on hydrogen fuel cells in the future.

AIM

- Objectives of our research:
 - Develop vehicle to serve as a low friction, lightweight test platform
 - Configure hybrid battery / fuel cell power system
 - Determine power system configurations to maximize endurance and speed of car
 - Additional goal: add a rotating rod to move side to side

*Researching and testing data points in this project will be applied to future research with aircrafts



ACKNOWLEDGEMENTS

CHEETA Cleantechnica.com -

<https://cleantechnica.com/2014/06/04/hydrogen-fuel-cell-vehicles-about-not-clean/>



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