Solar Truck (Alejandro)

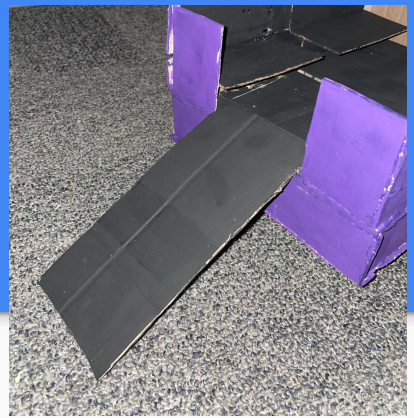
By: Mena, Muhammad, Trevor, Gabe
(BAM 1)


Alejandro

Overall Goal

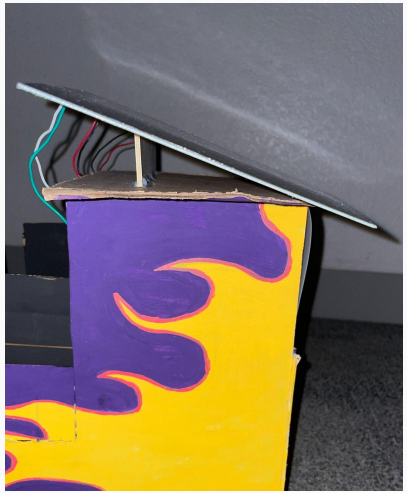
- Eco-friendly
- Taxi-drivers keep their jobs
- The main customers are party people
- This will lower the amount of drunk drivers
- Gives safe and fun rides to people who are intoxicated
- Reduces car crashes since there will be less drunk drivers
- Saves time crossing the Sparkyville strip

Unique Features



Creativity

- Seating arrangement (passengers in truck bed)
- Tailgate ramp (handicap accessible)
- Angled roof (optimal solar energy)
- Handicapped seating



Safety Features

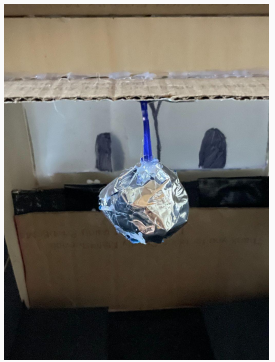
- Extreme hold outdoor seat belts
- Windshield
- Strong and durable frame to resemble an F-150 truck
- Stops at red light
- Low to ground to prevent roll over

Pretty Features

Theme: Party Truck

- Low Rider
- Disco Ball
- Colorful truck-style body
- Laser engraved name

Paint Design Inspo:



Design Process

Changes

- Orientation of the solar panels was changed (15 degree angle)
- An additional solar panel was added (3 in total)
- Axles were changed from wood to metal (wood was too weak and inefficient)
- Straws were added to the axles (Increased rotation)
- Gear ratio changed for better efficiency (5:3 to 5:1)
- Tires changed from 25 mm pulleys to 50mm for gear clearance

Total Project Cost

- Propulsion System- $30.48
  - (motor, gears, solar panels, axel system)
- Building Materials- $10.20
  - (wood, cardboard, rubberbands, etc.) (mostly recycled materials)
- Automation- $28.00
  - (breadboards, arduino, RGB sensor,)

TOTAL COST- 30.48+10.20+28.00= **$68.68**

Design Model

Values:

- Solar Panel Voltage: 12 v
- Solar Panel Current: 49.4 amp
- RPM: (MATLAB graph calculated RPM for 9kg) 4563 (rotations per second) / 60 (seconds)= 240 RPM
- Circumference = 2π(25mm) =50mmπ
- Gear Ratio: 50/10 = 5 = 5:1

Calculation:

- Linear Speed = (240 RPM)(50mmπ)(1min/60sec)(1ft/304.8mm) =2.06 ft./sec.

Future Enhancements

- Have the car run during night
- Possibly introduce wind or hydropower
- Add a rechargeable battery for when it turns dark
- Have music, lights, and more party features

Lessons Learned

- Time Management
- The importance of detailed plans and blueprints
- Communication is key
- Facing unexpected obstacles
- Programming and coding sensors
- Orders of operations and layed out procedures