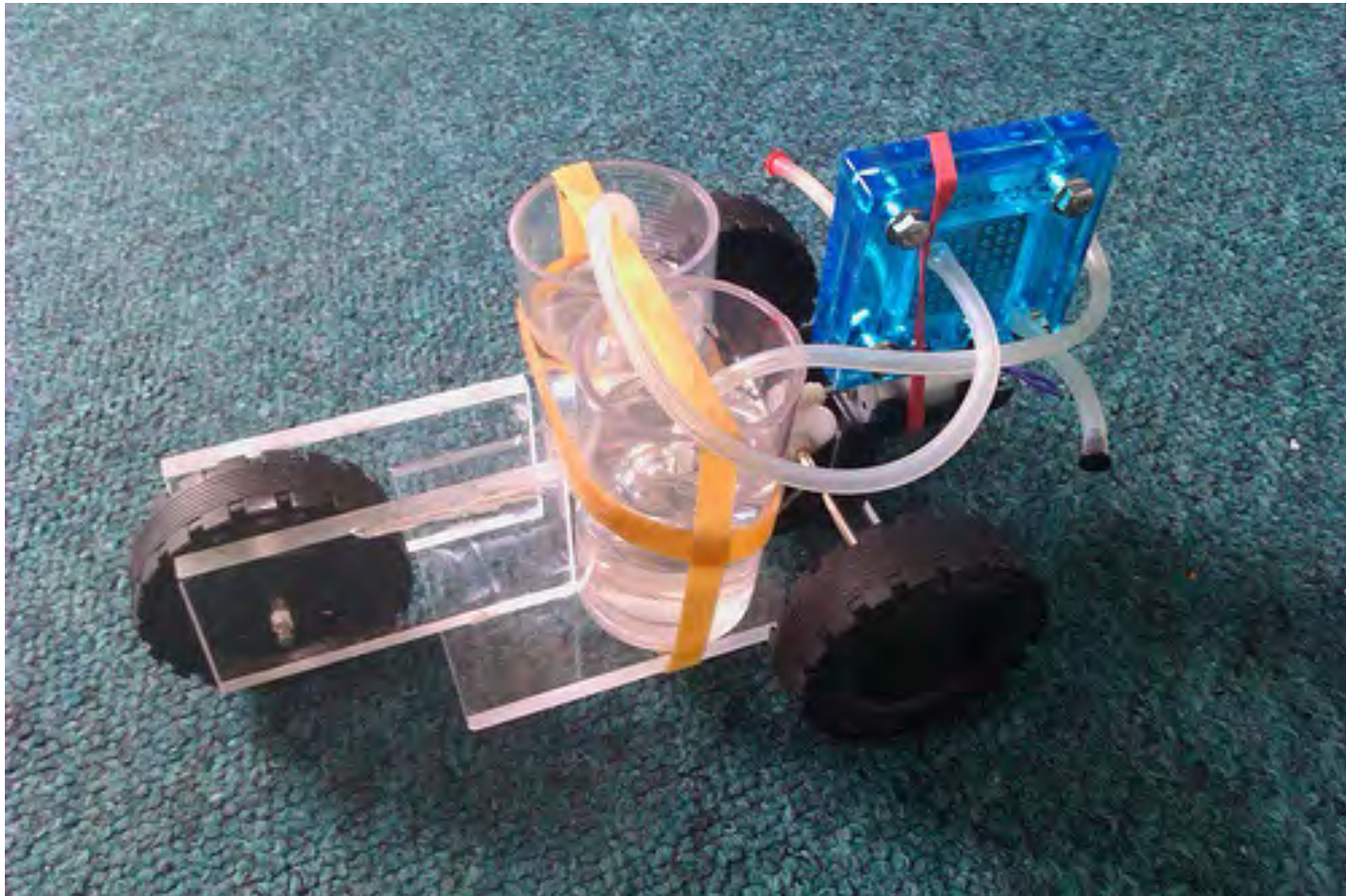
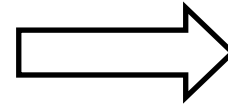
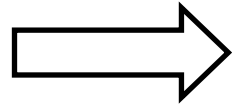
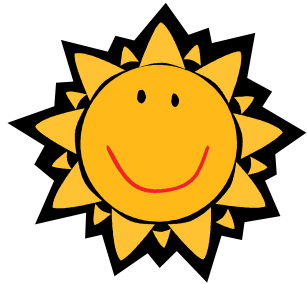


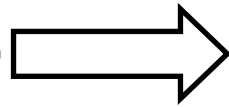
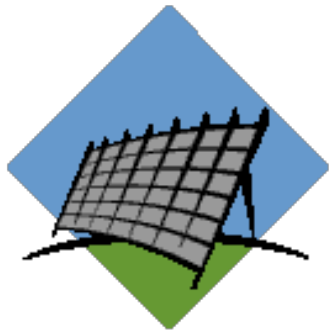
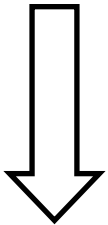
Hydrogen Fuel Cell- Cars



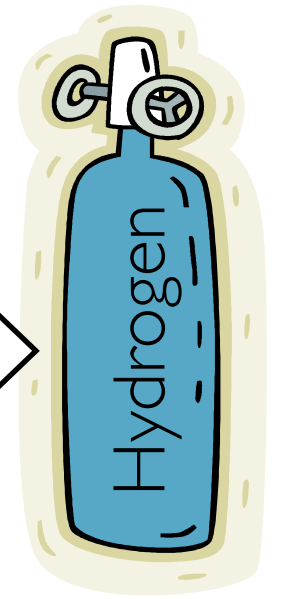
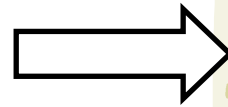
Where do we get the hydrogen from?



Photosynthesis



Electrolysis



Water -> Hydrogen and Oxygen

During the Project we:

- Learnt that a fuel cell works by supplying hydrogen fuel to the cell and also that the hydrogen could be produced in a variety of ways.
- Built a hydrogen fuel cell car.
- Used batteries and solar power to make hydrogen and oxygen by electrolysis.
- Used hydrogen and oxygen to power the fuel cell and make the car travel along a ramp.
- Discussed the advantages and disadvantages of hydrogen fuel cells.

Hydrogen fuel Cell Cars

Hypothesis

I think that the higher the ramp the faster the car will travel. This is so because when the car is placed at the top of the ramp it has a certain amount of gravitational potential energy, which is converted into kinetic energy when the car travels down the ramp.

Therefore, the higher the ramp the more gravitational potential energy there is to be converted into kinetic energy, resulting in more kinetic energy making the car travel at a faster speed.

Variables

Independent – Height of the ramp.

Dependent - The speed at which the car travels.

Controlled – The length of the ramp, the car that travels down the ramp, the surface of the ramp and material of the car.

Equipment:

- Wooden Ramp
- Stop watch
- Hydrogen Fuel cell car
- Black sugar paper
- Bricks

Method

Step: 1-Prepare the car for launch that means fuel the car using either the battery or water.

Step: 2-Set up the ramps and measure the height.

Step: 3- Start the experiment by placing the car at the base of the ramp.

Step: 4-Release the car and start the stop watch.

Step: 5-Record the time taken for the car to travel down the ramp.

Step: 6- Repeat steps 2 to 5 and change the height of the ramp for every trial.

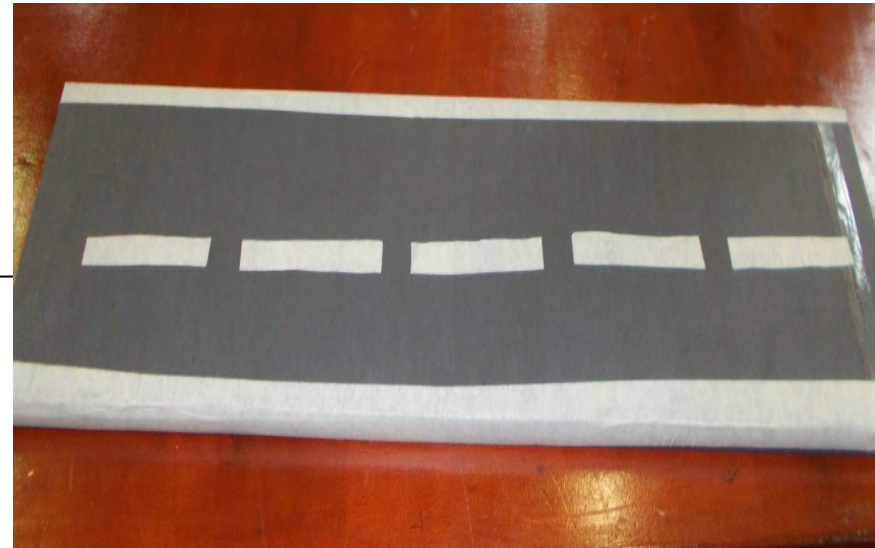
Step: 7- Repeat the experiment three times and then calculate an average.

Making the model for our experiment



The main structure of our model for our experiment was made out of two plain wooden ramps which were later coloured with black sugar paper and white masking tape so that they resemble a road .

After covering the ramp with black sugar paper and white masking tape this was our final product- a ramp that resembled a road.

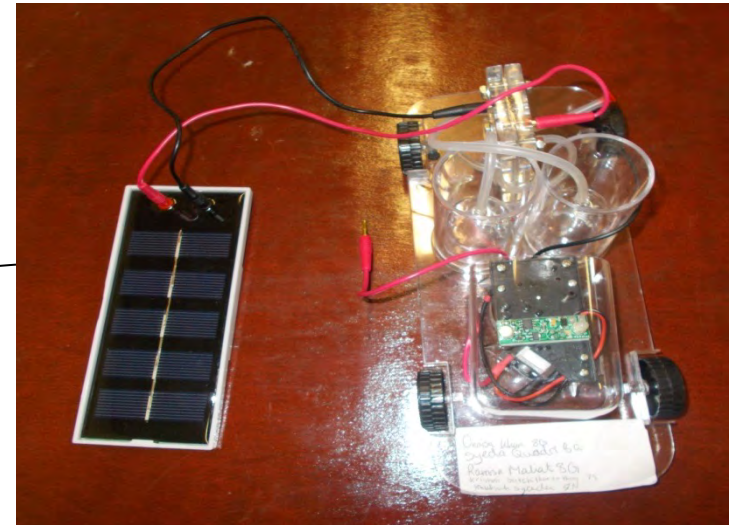


The second part of our experiment



We then used bricks .
These bricks were
then used to support
the ramp and increase
the height of the
ramp.

This is the
hydrogen fuel car
that was used in
our experiment.



The third part of our experiment



From here we then placed bricks on top of each other until both the ramps were the height that we wanted.



This is where our hydrogen fuel cell car started then travelled down ramp.



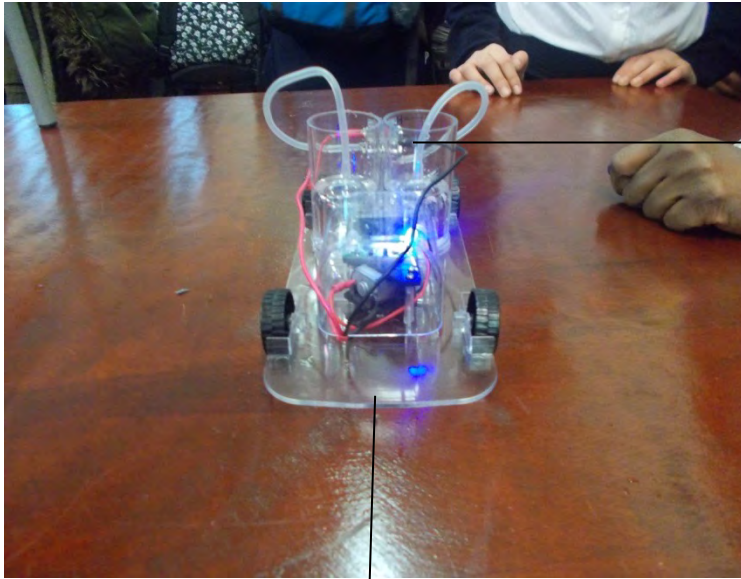
This is our ramp and we used a stop watch to measure the distance that the hydrogen fuel car travelled.



This is where we placed our bricks during our first test the height of our ramp was 19 mm and then we increased the height by adding one brick and made it 22 ½ mm and lastly it was increased to 24mm

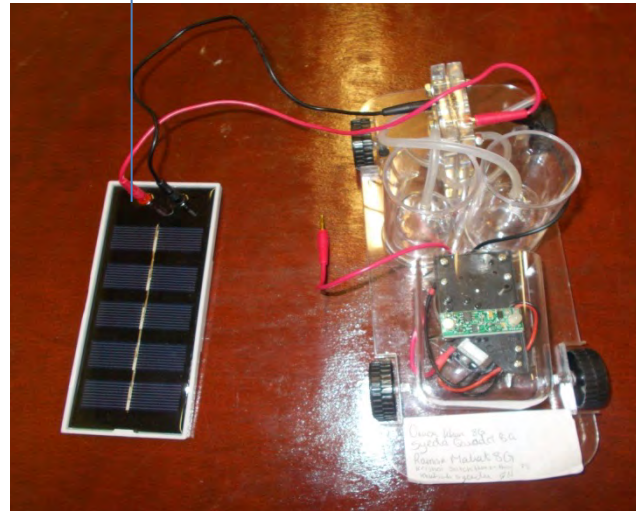
We used black sugar paper on the sides of both of our ramps to cover the bricks and also to make our entire model look better.

The Hydrogen fuel cell car



These round buckets is where the distilled water is placed this is what helped us power the car

This is a solar panel which was supposed to be used but because there was not much sunlight we had to use batteries to get the car working.



This is what the hydrogen fuel cell car looked like when it started working .

Table of Results

	Height of Ramps in cm	Time in seconds	Time in seconds	Time in seconds	Average time in seconds	Speed in metres per second
Trial 1	5.0	6.0	6.2	6.1	$29.3/3=9.7$	10.3
Trial 2	10.0	4.0	4.1	4.0	$12.1/3 =4.0$	25.0
Trial 3	15.0	2.3	2.2	2.2	$6.7/=2.2$	45.4

Distance of ramp=100 cm

Speed:

$\frac{\text{Distance travelled (cm)}}{\text{Time taken (s)}}$

Conclusion

Our prediction was that “the higher the ramp the faster the car will travel”.

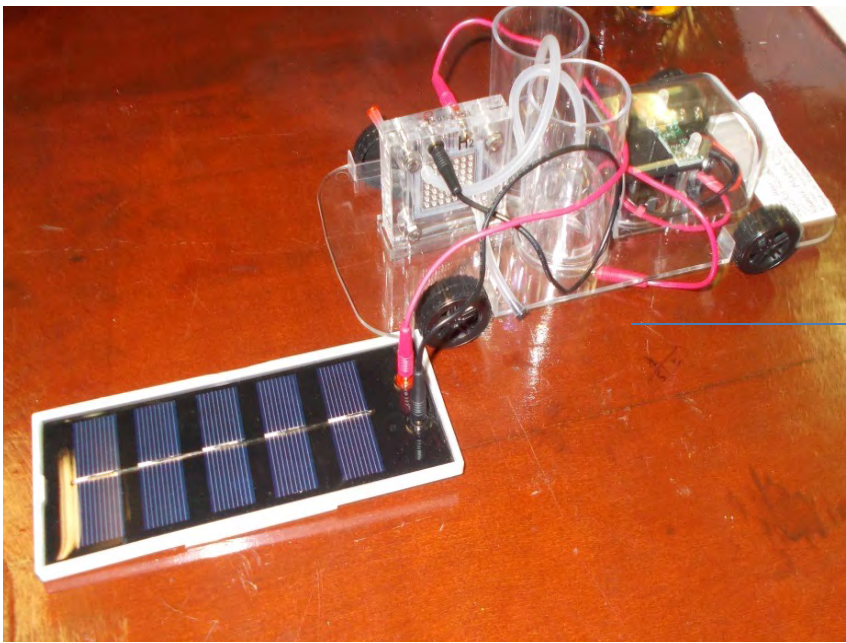
Our results showed that increasing the height of a ramp increased the inclination of the ramp, which in turn increased the speed at which the car travelled down the ramp.

Therefore, the higher the ramp the more gravitational potential energy there was to be converted into kinetic energy, resulting in more kinetic energy making the car travel at a faster speed.

Evaluation

There were many things that went wrong or simply just didn't work during our experiment. One of the biggest problems that we faced as a team was that we couldn't get our hydrogen fuel cell car to work.

At first we decided that we were going to power our car using distilled water which was not a good choice because as the car travelled down the ramp water spilt everywhere. In the end we decided that we would use batteries to power the cars.



Another problem that we came across was the fact that under the hydrogen fuel cell car there were round circular rings that had two wheels attached to it.

After many attempts we attached two wooden splints on to the circular ring under the car and this stopped the wheels from going around in circles. The car was then able to travel in a straight line.

This became a problem because we found that when the car travelled down the ramp it did not travel straight down the ramp but move around in circles.

Improvements

- ❑ To improve our investigation and extend it we could use a digital meter to make the results more accurate.
- ❑ If the experiment was to be extended we could use other vehicles to roll down the ramp, using different size, weight and type of wheels to see if this has any effect on the speed.
- ❑ We could improve the method by repeating more trials to ensure accuracy.