



ENTERPRISE PORTFOLIO

# MEET THE TEAM

Kepler racing is a team of 6 Year 13 students from St Marylebone C.E. School. All of us are currently studying A-Levels, including Maths, Physics, Chemistry and Art. We will be going on to studying STEM (Science, Technology, Engineering, Maths) related degrees in September. As a team we believe that the F1 in Schools Competition is a great opportunity to show our engineering talent, creativity, innovation and our entrepreneurial potential. Together, we face the difficulties and challenges from and fundraising through to design and manufacture.

## Jack Arnatt

I am currently studying Maths, Further Maths and Physics. My main role in the team was to research into manufacturing techniques and into the key features of the design. I also made the presentation for the competition day.

## Qingrui Song

I am an A level student currently studying Maths, Further Maths and Physics; with the intention of studying pure maths at university at the start of next year. I aim to become a professor of maths at a university. I was responsible for manufacturing engineering; I worked with the design engineer to see whether production of the design was feasible and was responsible for ensuring that the car was produced on time.

## Jesslin Ho

I study Art, Maths and Psychology A-Levels as school. In the next academic year I will be going to study a Product Design Engineering course at university. I aspire to become a Design Engineer in the future. My role in the team was team leader. My job was to assign tasks and make sure that they were completed on time. I also worked putting together both the portfolios.

## Taief Miah

I am currently studying Maths, Physics and Chemistry at A-Level; with the hope of studying medicine next year. I aspire to become a surgeon after I complete my degree. I was specifically responsible for business and enterprise related tasks. My role in the team was to create the marketing strategy and identify methods by which we could raise money. This involved analysis on the effectiveness of methods and what they meant about the image of our team.

## Kyra Mozley

I am studying A Levels in Maths, Further Maths, Physics and Chemistry. In October I will be going to study Computer Science at University. I would love to be a software engineer for a big company or go into academic research after completion of my degree. My main role in the team was doing the graphic design. I worked on the logo, website and portfolio design.

## Yutao Kuang

I am studying Maths, Further Maths, Physics and Chemistry and I will be studying Chemistry at university in October. I would like to go into Chemical research in the future. My main role was designing the car on the AutoCAD software. I had to make sure that it worked in the wind tunnel well. When the car was printed, I then helped in assembly.

## Team Identity

With in our first meetings, we had assigned ourselves with different team roles and come up with an identity for our team that we could later present to our sponsors and achieve success based on it. There were many different ideas for our name.

## Project Task

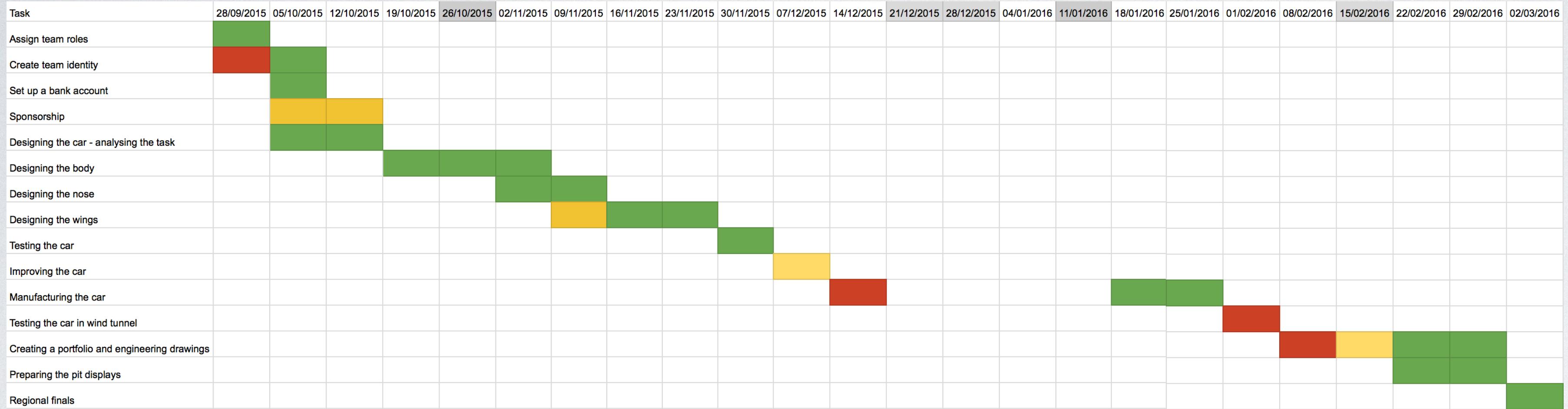
The aim of this project is to manufacture a miniature scale Formula 1 using CAD/CAM software. The race car will be powered by a CO<sub>2</sub> gas cylinder that would go in a straight line for 20m in the fastest possible time. The design would also have to comply with the Competition Regulations.

In order to compete for the No. 1 prize, not only a successful design was required, but also a 2 high quality portfolios had to be produced along with a pit display and presentation, which would be appealing to the judges.

## Mission Statement

Kepler Racing's mission is to create a collaborative working environment, in which every individual can strive towards success and develop their own individual skills, while still being part of the team.

# PROJECT MANAGEMENT



The Gantt Chart show our progression towards the Regional Finals. The tasks completed are in green, tasks which were not fully complete are in yellow and tasks which were not completed are in red. We all go to the same school and regularly meet up and communicate through emailing each other. Through this way the workload was evenly spread between us based on our strengths and interests and a majority of the tasks were completed in our own time.

Our main problem throughout the project was that it was difficult to get in touch with our allocated students from UCL. Despite having the final design ready in November we received feedback from them much later. This meant that we had very little time to improve the design of the car before we had to send it off to manufacture.

## Risks:

Not being able to complete tasks up to our expected standards due to the limited amount of time we have  
 Tasks taking longer to complete than planned  
 Not raising enough funding to take part in the Regional Finals

Identifying the most likely risks helped us to put a strategy forward to reduce these risks

## Dealing with risks:

Identify risk and consider the impact that it will have on the project  
 Assess the applicable ways and minimise the risk and try to overcome the problem  
 Evaluate how the risk was dealt with and improve on ways to minimise the negative impact it has on the project or think of ways to prevent it as much as possible



# TEAMWORK

Our team consists of 6 people with 2 people each working in one of the 3 work groups: research and engineering, business management and graphic design. Each person is responsible for their own task but there is also flexibility within and members from other work groups can help solve problems and overcome challenges together.

The design manufacturing engineers was responsible for researching and designing the car and making sure that it could be manufactured. The business and events managers were responsible for the marketing and PR. The graphic designer would create the team logo and design posters for the marketing team and the pit display. The team manager would organise time and resources and liaise with all team members to check that tasks are progressing on time and also offers help when needed.

Communication played a key role in our team throughout the project. Being able to communicate well helped us avoid understand each other better and also avoid conflict. We needed a quick and easy way to of communicating with each other. The most convenient method of communication was by email but for more pressing matters meetings would be held during lunch to avoid meetings eating away too much time outside of school seen as most work was done outside of school times

# TEAM IDENTITY & BRANDING

## Team Names

We put in lots of thoughts and came up 5 team names, and selected the best one by voting. The 5 team names are as follows:

- Marylebone Speedies
- Demon Racer
- Rapid racer
- Kepler
- Turbotastic

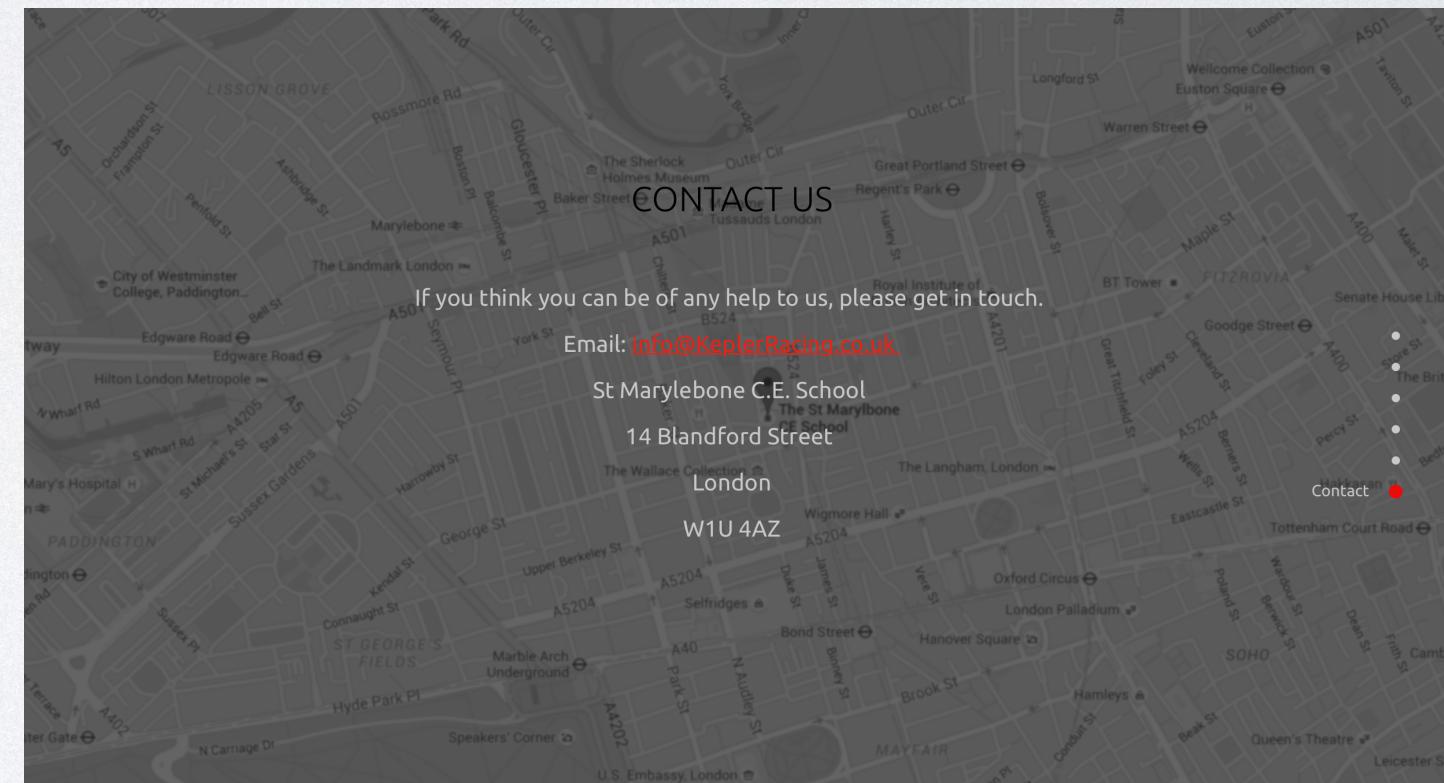
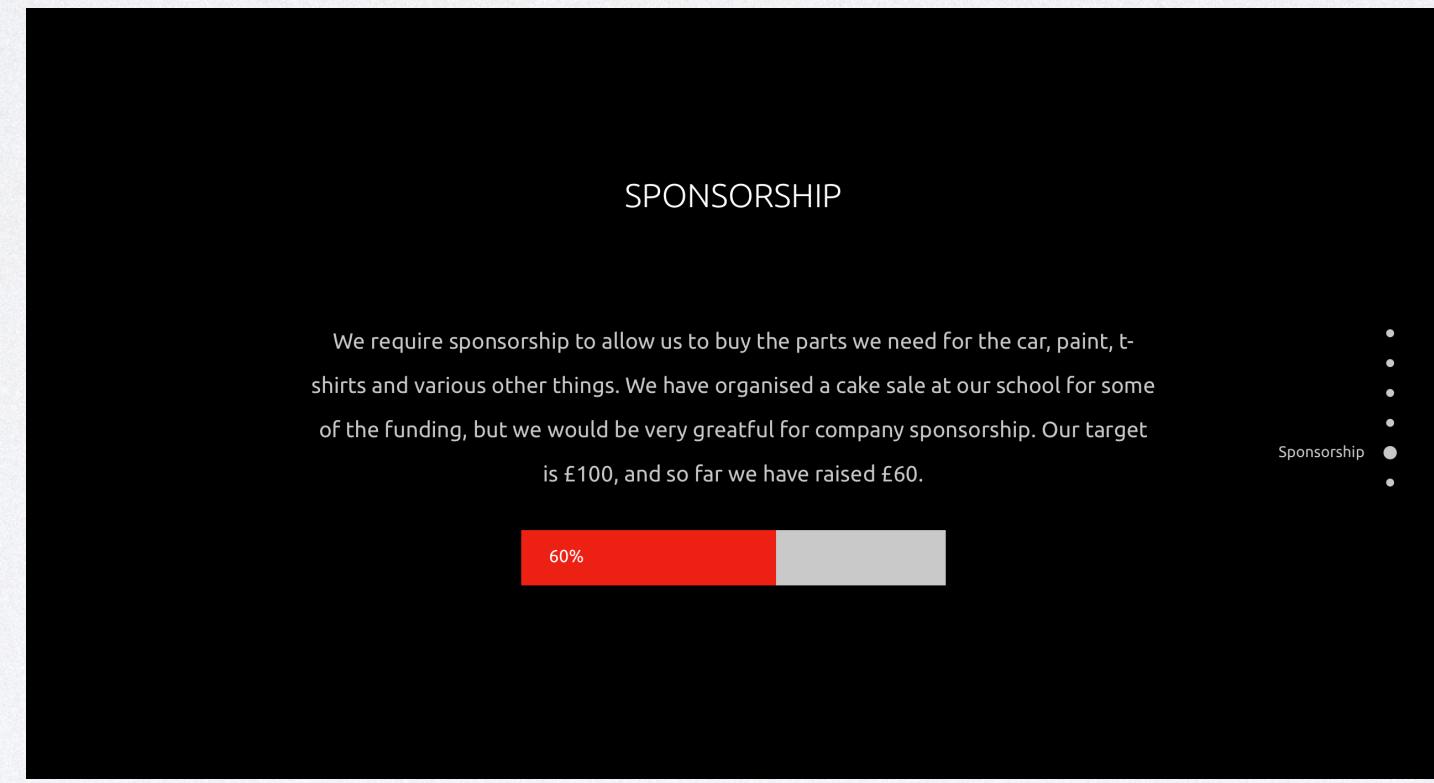
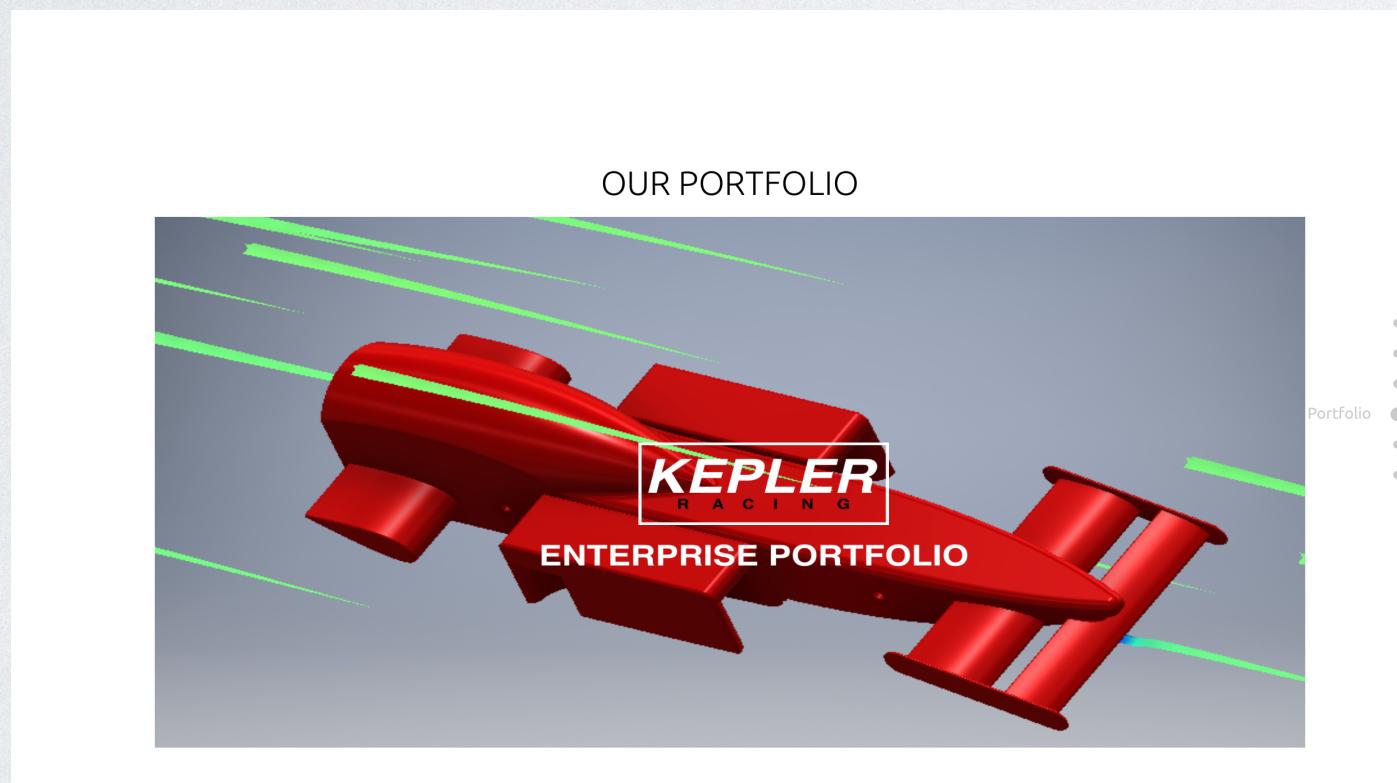
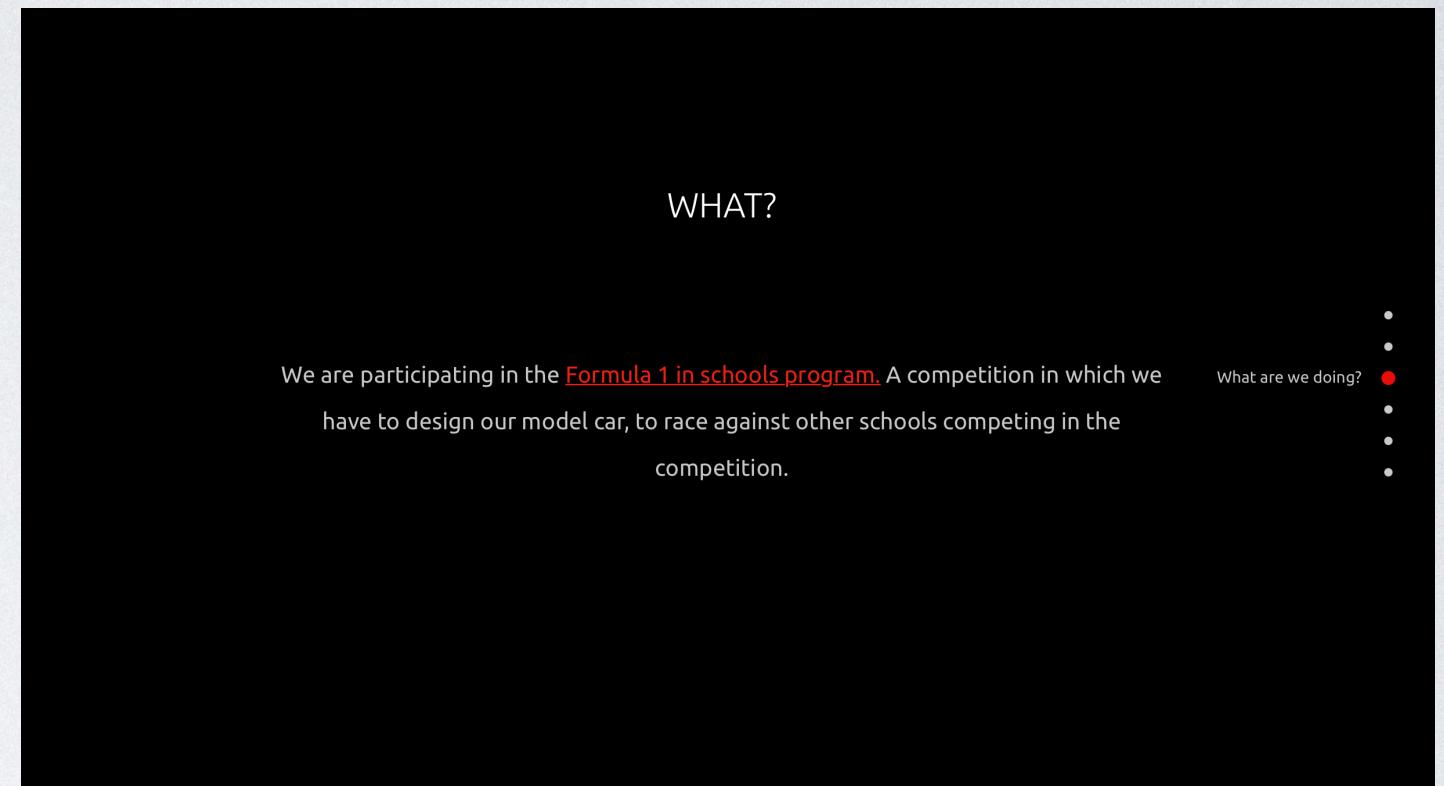
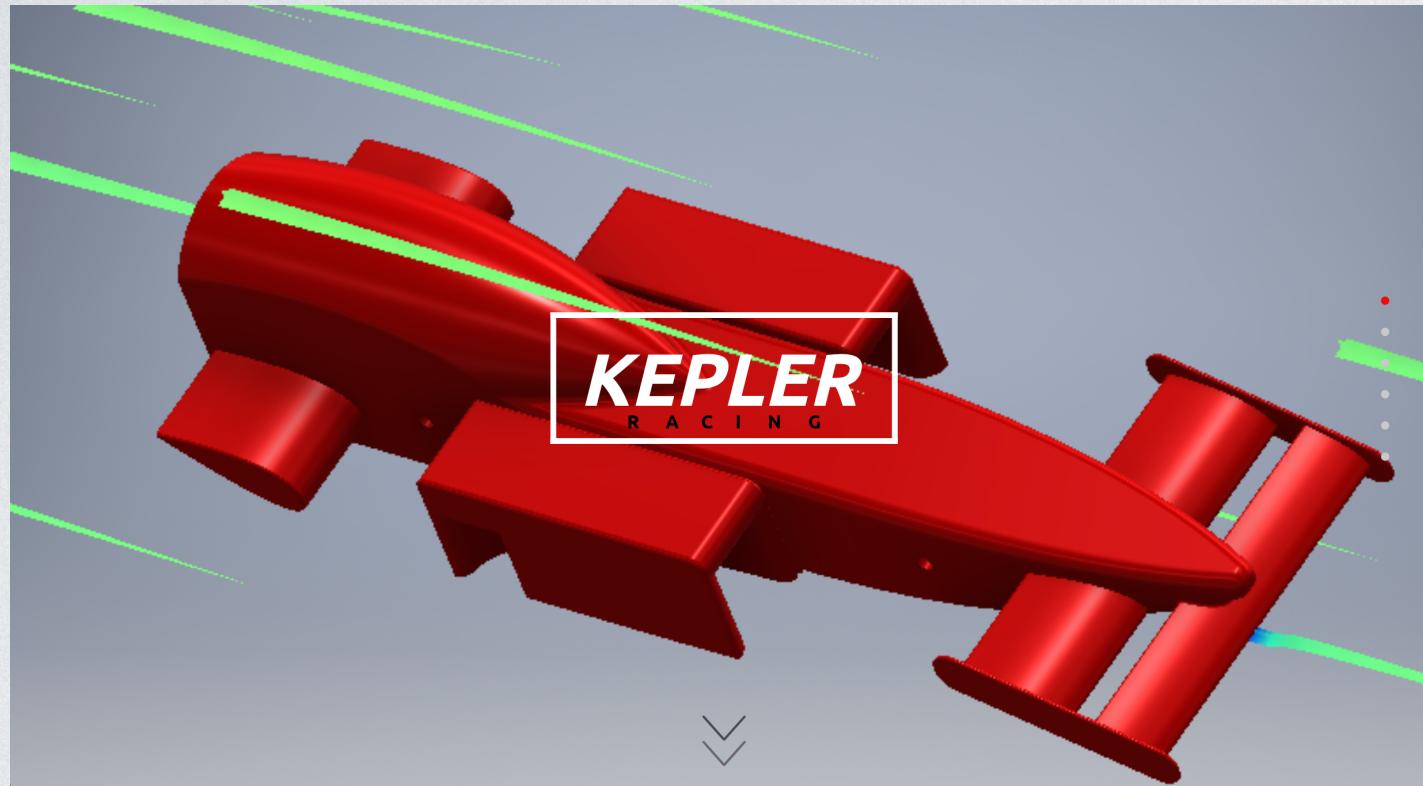
The name Kepler stood out most to us as it is very different in comparison to the typical names which refer to 'speed' etc. The name Kepler Racing is after Johannesburg Kepler, a German Mathematician and Physicist. We were learning about him and his work in Physics ruins the time of trying to think for a name, and so we thought that the name worked well.



Here is a variety of different logo designs our graphic designer created. They were all following the theme of cars/racing.



# WEBSITE



We designed a website, the URL is [KeplerRacing.co.uk](http://KeplerRacing.co.uk). The main point of this was so that when we could email sponsors, it would help us to easily display our information and who we are. It also helped us to collect all our relevant ideas and put it in one place.



# T-SHIRTS



Front



Back

It is important to identify our selves as a team. T-Shirts are a good way of doing this as it makes you easily recognisable as a team.

We decided to go with a black t-shirt and white writing as it goes well with our colour scheme. Black and white is prominently known as a racing colour.

We put our team known large on the back and a little logo at the front. We also put our names on it to make it look more professional. We also put our school logo on and UCLs on as these are the two people who have helped our car go from a concept to a reality.

We are using a die sublimation printer to print our design, then use heat press to transfer it onto our shirts.

However, when using the die on a test black shirt we found it hard to print onto black as it did not show up. So we had to swap the black t-shirts for white ones so that we were able to print on it clearly.



# SPONSORSHIP & BUDGET

There were some essentials that we had to buy to compete in the competition. This included the wood for the car and all its components. Additional things that we wanted to buy included T-Shirts, a Website Domain. We were very lucky that we got to use equipment and things such as paint thanks to our DT department.

## Outflow

- 2x Denford Packages:  $2 \times £20.40 = £40.80$
- 6 x White T-Shirts:  $6 \times £2.50 = £15$
- Website Domain: £1.99
- Printing: £5

Total out: £62.79

## Inflow

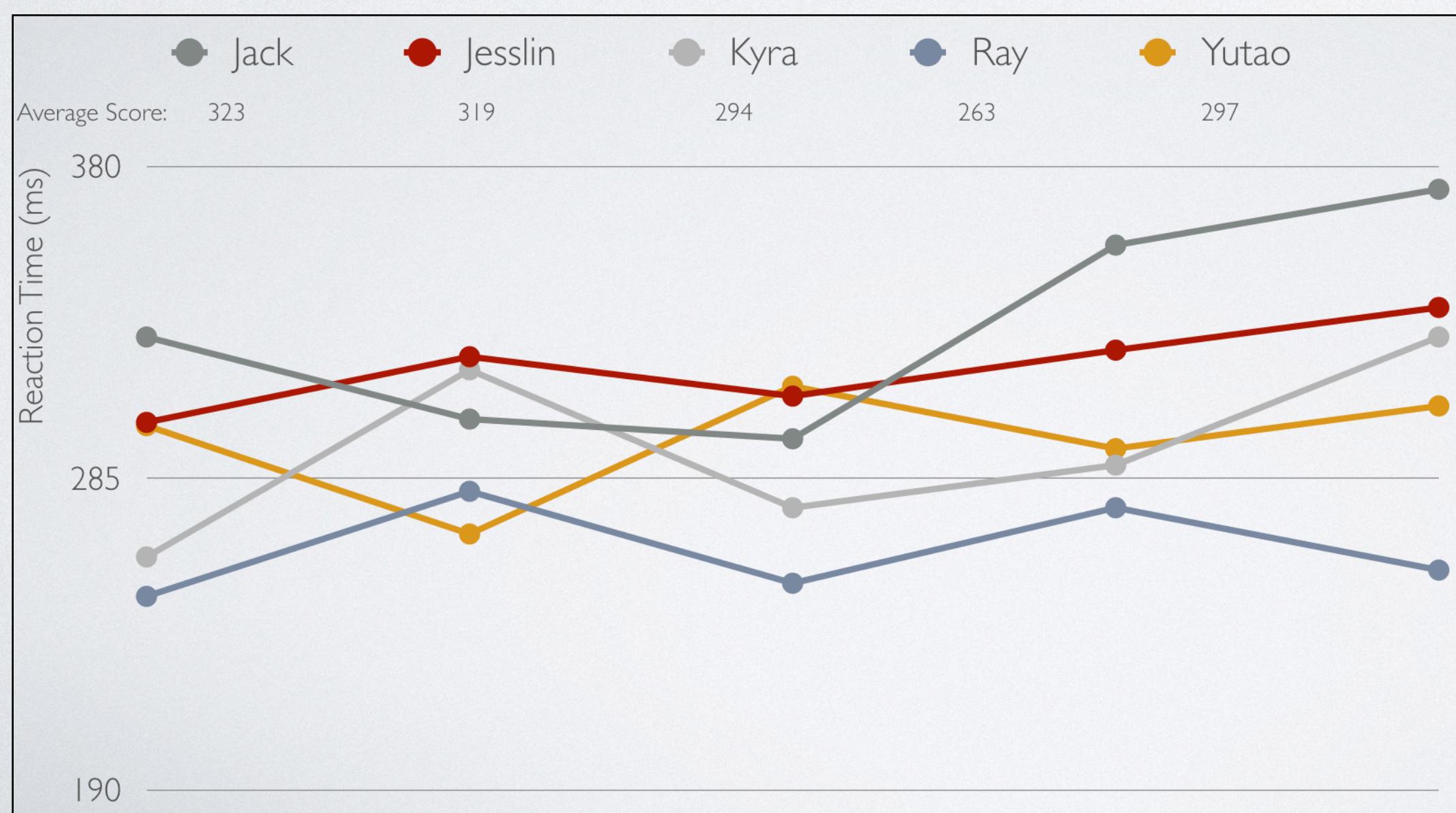
- Cake Sale £20
- Total in: £20

Total Money: £62.79 - £20 = **-£42.79**

We tried to gain sponsorship from companies but we were unsuccessful due to starting to contact companies too late. Therefore we tried to have a cake sale, in which we raised £20 towards the event. This then went on buying T-Shirts. Due to lack of funds, our school kindly provided us with a float of £100.

# REACTION TIME TESTING

As part of the competition involves pressing the button to start the car once the lights go off it is important to test who out of the team has the best reaction time as every second counts in the competition. We used an online website (<http://www.humanbenchmark.com/tests/reactiontime>) in which you have to click the button when the screen turned from red to green, which is similar to what we will have to do at the real thing.



We then produced a graph (see below) showing the variation of peoples scores with 5 trials.

From this, and the mean calculated we can see that Ray had the best time consistently therefore we decided that he should be the one to press the button on the day of the competition.

# PROJECT EVALUATION

## What Went Well

---

We all worked together well as a team. Everybody had a part to play in making our car and bringing it alive. If people were slacking then the team leader would chase them up and make sure they completed the tasks they were asked to do.

---

We believe that our design is very good as the air should flow well over it. We have had UCL students look over it and give their opinion therefore it should be good. However, we may be proved wrong on the actual competition day.

---

We allocated the jobs well to people abilities and talents. This was good as it meant tailoring meant the person would take an interest and ensure it was done.

---

Measuring our reaction time was something that we had not seen in other portfolios, yet it is very important as you get marked on it, and it will affect the overall time of the car.

## Even Better If

---

Although we signed up to compete in the competition at the end of September, production was rather slow. As we got more and more involved with things such as UCAS, interviews and Mock revision, there was a lot less time for us to meet up. At times we tried to collaboratively work thanks to software such as google drive. However, if we were to do this again, we would order the equipment sooner and complete the design earlier to allow us to test.

---

If we were able to get sponsorship for our car, it would have allowed us to use better equipment for manufacturing as we ended up doing a lot of it by hand. In addition, we would have been able to use ball barring wheels which would allow them to move a lot easier.

---

Even though UCL told us to make our car heavier for fears of the car body being underweight, when the equipment came, the wheels and axle already weight 52g. Therefore, it meant that the car would weigh a lot. As  $F = ma$ , this will reduce the maximum possible acceleration.