ENGINEERING PROCESS

Special thanks to our former team manager Emily and her contributions to the design and engineering process

IDEAS:

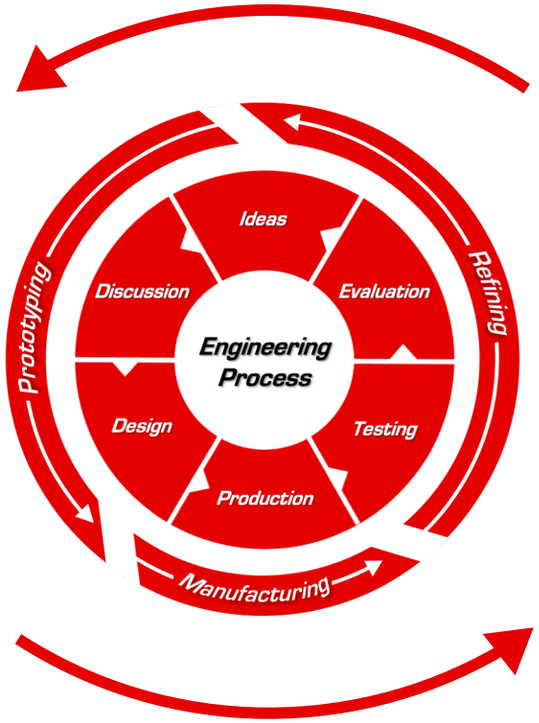
Influenced by research into aerodynamics and into Formula 1 Cars, we would devise ideas and design concepts for our own car, alongside finding new ways to adjust certain components to extract maximum performance.

DISCUSSION:

Allows for evolution and refinement of initial concepts into specific and detailed design features, as well as the combination of these ideas to form possible car bodies and components.

DESIGN:

The creation of a complete, functional and manufacturable design from prior research, ideas and findings, which would then be transferred from pen and paper to CAD software.



EVALUATION:

Test results are analysed and used to determine both the successful elements of the car, but more importantly, what needs to be changed.

TESTING:

Design concepts are tested, both virtually (using simulations) to quickly assess the effects of small changes in design, and physically (on track) to assess durability and how the actual performance compares to our theoretical results.

PRODUCTION:

** DOES NOT APPLY IF THE TESTING CONDUCTED AFTERWARDS IS VIRTUAL*

Various components are exported from the CAD software and manufactured using CNC machines. These components would then be assembled, and either tested (at the prototyping stage) or finished with paint and decals to produce a final, race day-ready car.

APPROACH TO DESIGN

Our initial approach to designing was to look at the shapes of recent Formula 1 cars and adapt these to produce a simplified, smaller-scale version for our car. However, having started our research, we quickly realised that there were several differences in the requirements for optimum performance of our model vs. those of real Formula 1 cars, which meant that there were certain aspects of their designs which would not necessarily be as effective, in our circumstances.

Formula 1 Design:	*F1 in Schools Design:*
Many components are designed around the generation of downforce, due to the necessity for grip and stability when cornering at high speeds	*The car races on a straight track, so minimising drag, rather than generating downforce, should be our primary focus (although a little downforce is necessary to stop the initial thrust from the CO_2 cartridge from lifting the car off the track).*
Wheels are driven by the power unit	*Car is driven by a jet of high-pressure gas so, when looking at aerodynamic design, we need to take into account the interaction between the airflow around the back of the car, and that of the CO_2 stream*
Certain features are designed to accommodate the needs of the driver and other vital elements (eg: cooling the power unit)	*Our car has neither a drivetrain, nor a driver, so we do not need to worry about including air intakes/cockpits/halos/etc., all of which increase drag*

We therefore decided to change our approach to research, looking deeper into each of the individual components. The most important part would be gaining an understanding of the function and design of these components, in order to then apply and adapt only the relevant concepts to our own car.