



APPLICANT 9 – HYPERLOOP / LOW FRICTION TRANSPORTATION (A Joint Project)

What does/did your project aim to achieve? **Please write up to a maximum of 300 characters**

For my English GCSE, I researched Elon Musk's Hyperloop concept. I was so interested, that my research inspired this project. Hyperloops are an innovative concept for travel of up to several hundred miles. As our population rises, we need efficient transport, travelling in an environmentally friendly, yet quick and easy way. Hyperloops aim to significantly reduce friction, allowing high efficiency and very high speeds to be achieved. This project explored issues with low friction transportation.

Please describe and explain your project making clear and direct reference to your supporting documentation. **Please write up to a maximum of 1000 characters**

I initially chose the type of friction reduction, choosing to investigate air levitation (Air-lev) as magnet levitation (Mag-lev) is complex on a small scale due to electro-magnets being difficult to calibrate. We built a simple demo to investigate Air-lev behaviour, using a CD and balloon (*1st file*) and changed parameters to see how performance was affected. By channelling the air, adding a skirt, and building a simple track, we concluded we needed a more consistent, controllable air flow.

What have been the successes and failures of your project so far? **Please write up to a maximum of 500 characters**

I worked with a project partner. My key decisions covered:

Design research.

Hardware, circuitry, control system, data handling.

Fan, battery and Electronic Speed Controller (ESC) specs.

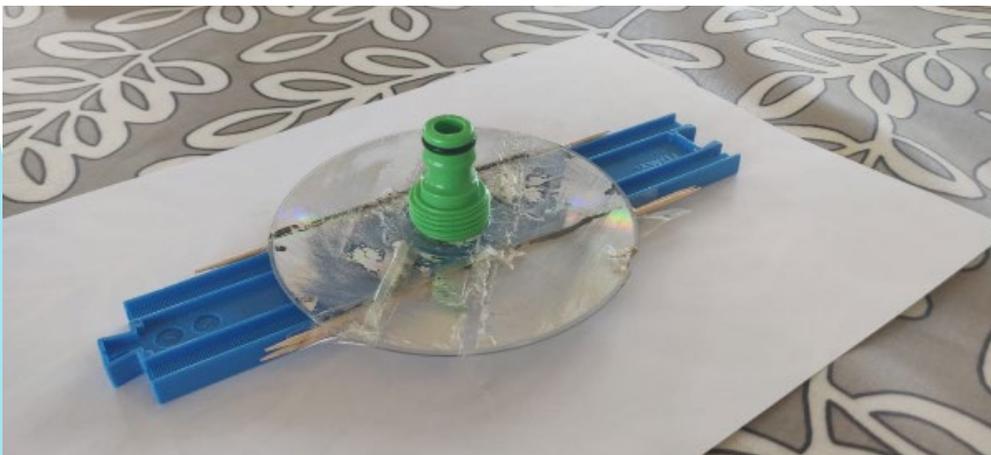
Programming (eg. Arduino for fan control).

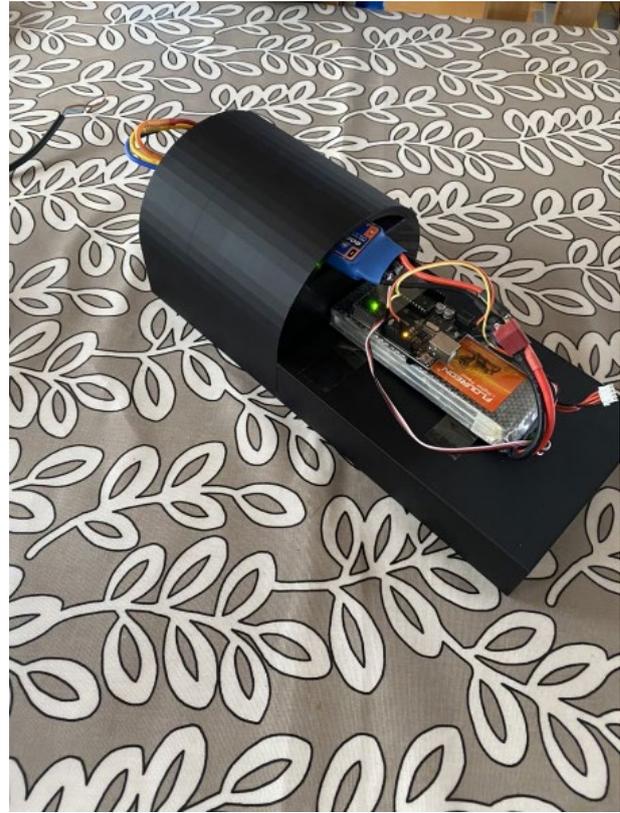
Issues with our concept (*2nd file*) included centrifugal drift (fan spin), fan choking (turbulence), and instability (high centre of gravity) we rectified this in (*3rd file*). I then saw that battery discharge affected air-flow so I re-wrote the control code.

What lessons of an engineering nature have you learnt from working on this project? **Please write up to a maximum of 500 characters**

The project has allowed us to learn multiple engineering processes such as; 3D modelling, 3D printing, programming with an Arduino, specification of hardware, iterative design, manufacturing of prototypes, testing, data gathering and budgeting. Working with a partner allowed us to brain storm ideas and allocate roles in relation to our skill sets and to support each other as a team which is good experience as engineers do not work in isolation. This has been a very enjoyable project.

VISUAL EVIDENCE





MARKER'S COMMENTS

This applicant has told us about both the inspiration for this joint project and the specific roles that both people involved undertook. Stating the role(s) you undertake is very important for a joint project. Clear references have been made in the text to each of the three uploaded files. Something that many applicants fail to do. The design/make/test nature of this project has enabled continual improvements to take place: these are again documented in the text provided. Both successes **and** failures are outlined: don't think that you will be marked down if you tell us what went wrong! This 'home-based' project has allowed this applicant to develop a wide range of practical engineering skills as well as their teamwork capability.