Week 1

My first correspondence with Dr Greame Ackland pertaining to the Pandemic senior honours project was on January 3rd. The following day we organised a teams meeting and discussed the goals and targets for the project. Here I assigned myself the tasks of completing the numerical integration of the SIR functions in python, reading about potential future models that may fit better and drawing vector fields to illustrate the differential equations of pandemic modelling. This was all finished and with a few tweaks from Greame everything was correct.

I spent the following week focusing on what the final goal of the project would be. I came to Graeme with the suggestion of trying to recreate the real UK pandemic through modelling and data analysis. At first this was seen as incredibly ambitious as apparently nobody has managed to achieve this before, therefore the goal was adapted to recreating the graph and seeing how close we could get.

For this to work I needed to make sure I was using the correct model as the SIR model would not be sufficient for COVID-19. Suffers of COVID-19 tend to have an incubation period of several days where they are symptomless, furthermore, studies suggest that people who have recovered only have temporary immunity. Therefore the a modified version of the SEIRS model was used as this best fit the nature of the COVID-19 virus. However, we also have to consider that a sizable portion of the population will be vaccinated. Therefore another Compartment V was added which includes Vaccinated individuals. Of course, a large number of details can be added such as death and birth rates, the probability of Vaccinated people becoming reinfected, Covid-19 variants, and the time dependant constant values. However, I consider the model to have enough detail for now. Time dependant variables need to be calculated now where beta was calculated for each day of the pandemic on our world in data. Then the code was modified to use the values given when they were exported to a csv file.