



Summarise your idea using our 'fill in the blanks' template below and a visual which reflects your project.



MY INNOVATION IS CALLED ProtectU

MY NAME / TEAM NAME IS The Three Masketeers

I / WE GO TO SCHOOL AT Aquinas College

MY / OUR BIG IDEA IS A mask cover to add an extra layer of protection from catching Covid-19 wearing a surgical mask

AND IT HELPS Protect the health of frontline workers as well as members of the general population

BY SOLVING THE PROBLEM OF Frontline workers contracting COVID-19 despite wearing surgical masks and other Items of Personal Protective Equipment (PPE).



INNOVATION NAME
ProtectU





THE PROBLEM

Communicate the problem you are trying to solve, how big it is, who it affects and why it matters.

Masks are proving to be a crucial tool in fighting off coronavirus. They are a common sight now days and are highly recommended to wear by the World Health Organization. However there are many problems with the classic surgical mask that no-one has done anything about.

Single-use

These masks are intended for single use only and this causes a shortage in masks. It also isn't very sustainable.



Virus survivability

Coronavirus particles can stay on the outside layer of a surgical mask for up to 7 days

Dampness

The current surgical masks are prone to getting damp from the person breathing. This is a huge issue as if the mask is damp the virus can get through and infect them through the mask.

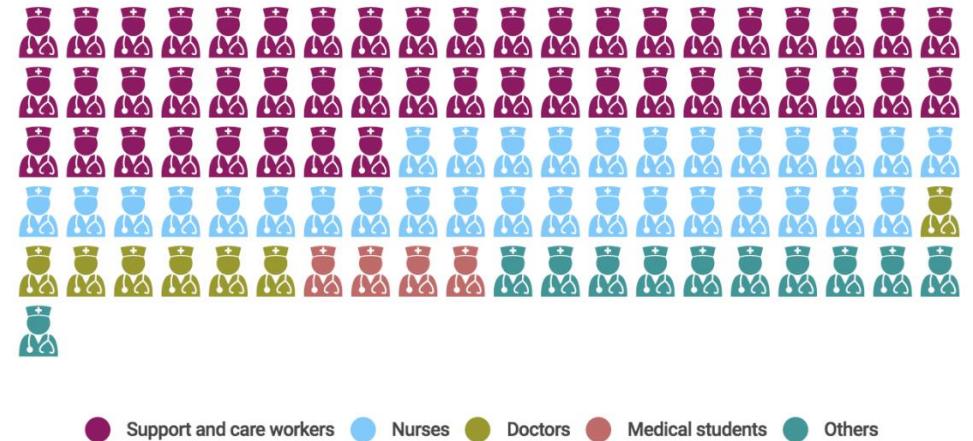
Fit
The surgical mask doesn't fit to the face very effectively due to its rectangular shape. There is often gaps left on the sides. Gaps around the nose area are the biggest issue, it causes glasses steam up, which is extremely irritating. Straps behind the ears aren't good either - they rub which is extremely uncomfortable.

Effectivity
Through research, scientists have discovered wearing a face mask only reduces the chance of infection by 6%. In a survey we conducted, the average guess for how effective masks are was 5.5 out of 10. 6% is quite a lot lower than this!!

Touching the mask
Masks also reduce in their effectivity as people touch them. People touch their faces in an average of 20 times an hour.

This is a huge problem as people who wear masks often believe that it gives them enough protection against viruses, but in reality, they may not.

Health workers tested positive for Covid-19



Because of ineffective PPE, Health workers are at high risk of catching the coronavirus. As of 28 April, 11% of New Zealand's total cases were health workers.

What's being done to solve this?

Currently, Canadian scientists are developing salt-coated masks to kill viruses but its completion to be sold in the market is still a year and a half away.

Our goal is to create a mask that is reusable, fits to the face and is effective in reducing infection rates. We will look towards having a home solution that is easy for the average person to make.

YOUR RESEARCH

Communicate who your innovation is for, what they need, who you spoke to when carrying out your research and what technology or science you might use to make your innovation work.

Virus-reducing solution

To make the mask more effective we looked into having some sort of solution applied on it to kill the virus when it encounters it. We want to look for an affordable solution that can be brought in the supermarket or made at home. While researching, we found an experiment had been done in which mice were infected by an influenza virus incubated on bare and salt-coated filters. The mice infected by the virus from salt-coated filters had a 100% survivability rate, whereas the control group had a 0% survivability rate. Recreating the salt coating at home won't have the same results likely wouldn't be as effective as lab chemicals but is certainly a viable solution to increase mask' effectivity.

Shape

Searching around, there are a lot of shapes for masks out there with a suitable face fitting better than the surgical mask, the most popular shape being featured below. It fits with the contour of the face and is simple to manufacture.



However it is really hard to get a fit over the nose. A wire will be required around the nose area so there are no gaps.

Straps

The current straps loop behind the ears and rub, which is quite painful. To avoid having the same issue, the mask that we make should have straps going around the back of the head.

Dampness

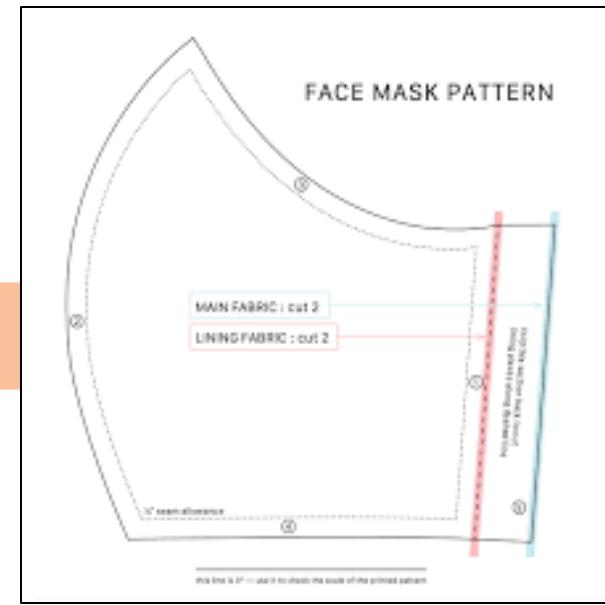
Reducing the dampness of a person's breath is reasonable. However, if we make our mask as a cover over the original surgical mask, dampness wouldn't be an issue as there is an extra layer of protection

Mask Fabric

For our mask we want it to be reusable to reduce environmental waste. We need to find a fabric to make the mask out of that is breathable and able to absorb the salt solution. The two most common fabric choices are cotton and polyester. Both are good mask options, but cotton is more environmentally friendly, breathable and absorbent. Because of this we have decided to use cotton for this mask.

Prototype

To test all of our research ideas we made a prototype mask. This worked extremely well and fit the specifications we desired. The mask got stiff once the salt solution was added to it, but this didn't affect the mask much at all. It didn't smell salty when worn, which was a good thing!



YOUR INNOVATION

Explain your final idea, how it works and how it solves a problem.

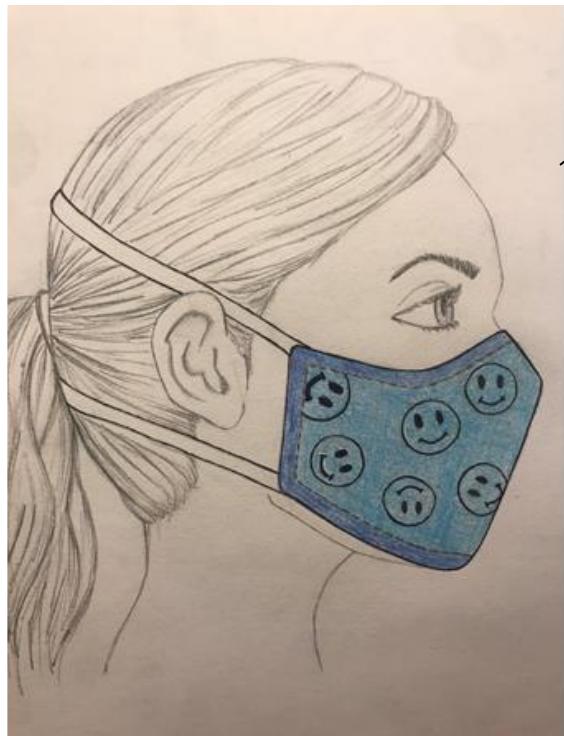
The mask has straps that go behind the back of the head. This is to avoid the problem that nurses have been having, that the straps behind the ears rub painfully.

The shape is also made to fit the face a lot better, as well as having a wire at the top. This way there are no gaps as per the recommendation on the WHO website so the virus cannot get in, as well as reducing the problem of steaming glasses.

It is important to note that with masks it is extremely hard to get a one size fits all. A mask made for an adult is not going to fit a young child. For this project however, we will make a mask sized to fit the average adult to fit the highest percentage of the general population.

Because everything is so readily available, this solution can be made at home very easily. It is very affordable as it could even be made out of an old t-shirt and still have the same level of protection.

The mask is covered in a salt solution to help kill the virus. This way if people touch the mask when they shouldn't be it reduces the chance of catching the virus.



From the survey we sent out, 18 out of 28 people said they would use this mask if scientifically proved effective. The remaining 10 were not opposed to this idea.

The salt solution can be easily made by mixing a cup of water and 4 tablespoons of salt. Once the salt dissolves, soak the mask in the solution and leave to dry.

Having this as a cover over the classic surgical mask means that when the surgical mask gets damp the mask wearer can still be protected from the virus.

All the aspects of this solution put together help make the mask more effective in keeping out the virus in an affordable, reusable manner.