

# Hwa Chong Institution

## Project Work

### Category 3 Inventions Log Book

Title of Project: Anti-fogging mask
Group Name: 3-20
Group Members: 1) Kerk Heng Xu (1P2) 2) Loong Qi Fang Zavier (1O2) 3) Lin Jintian (1O2) 4) Low Yu Ze (1O2)

# 1. Problem Finding

(The beginning...)

Identify a problem you would like to solve. You may want to brainstorm for problems using different approaches (e.g. thematic, survey or general brainstorming etc.)

**1A) Document a list of problems you have identified. Your documentation should show clearly how your group came up with the problems.**

## Problem 1: Fogging of spectacles

- Water vapour escapes from the top of our masks which then condenses on our spectacles into water droplets, making our glasses fogged up while wearing masks, thus we have to remove our spectacles and wipe the water droplets off or else it will be very blurry.

## Problem 2: Bulkiness of electric sharpeners

- Electronic sharpeners are too expensive and bulky, hence we want to make a lighter and more convenient sharpener.

## Problem 3: Cold feet

- During cold seasons and times of the year, our feet would feel very cold when wearing slippers or shoes that are not covered. In Singapore, this may not be a problem at all but in countries with four seasons, peoples' feet get freezing-cold , causing numbness.

**1B) You should have selected a problem based on some considerations. Identify and justify these considerations.**

**We evaluated the options with four considerations to help us decide on the problem to work on.**

- 1) Potential cost effectiveness - It allows us to consider the amount of funds to ensure that it is low cost so that there will be buyers willing to purchase our product.
- 2) Impact of the problem - For us to research how serious the problem is and how many people in the world are affected by it.
- 3) Feasibility of the solution -Is the problem possible to solve within our ability, the short project timeframe given as well as with the limited funds / resources we have.
- 4) Lack of existing solutions - Are there already existing solutions to these problems and how effective are these solutions.

**1C) List some problems your group would like to solve. List also the considerations for selection of problem in the evaluation grid below. Score the considerations, against the problems, with points 1 (least significant) to 4 (most significant). Sum up the total points for each problem. Identify that problem you would like to solve.**

## Problem Evaluation Grid

\*add more columns and rows where necessary

Considerations for Selection	Problems		
	Masks causing mist on spectacles	Inconvenience of sharpeners/electric sharpeners too expensive	Cold feet during cold seasons
Potential cost effectiveness	3	3	2
Impact of the problem	4	1	3
Feasibility of the solution	3	4	1
Lack of existing solutions	4	2	2
Total Score	13	10	7

## 2. Define the Problem (This is one...)

Now that the problem has been identified, it is important to gather information on the extent of the problem and/or evaluate the usefulness of existing solutions based on *some criteria*. You may need to conduct surveys and research on existing solutions.

### **2A) Extent of problem (Research and discuss the problem and write down the problem statement)**

According to the Google surveys we created on these three problems, 80 % of the people found that the fogging of the spectacles as well as the heat trapped in the masks the most problematic. We also experienced the hotness caused by the masks and the fogging of the spectacles. Moreover, based on the evaluation grid as shown above, the masks seem like the most significant problem. Thus, we have decided to invent a cooling anti-fogging mask which cools down our faces as well as prevents condensation on the surface of our spectacles.

### **2B) Compare and contrast the existing or similar solutions.**

#### **Using soap and water to wash the lenses of the spectacles**

- Most people find it troublesome to clean the lenses with soap and water every day.
- When their spectacles fog up, they do not have an immediate solution to it as they have to get soap and water from the toilet to wash them.

### Taping the mask down over the bridge of our noses and to our cheeks with sports and medical tape

- When one removes his mask for meals, the tape might lose the stickiness afterwards and he will have to tape it again.
- It allows less air circulation to occur, thus affecting the breathing of the person.

## 3. Your BIG IDEA<sup>#</sup>

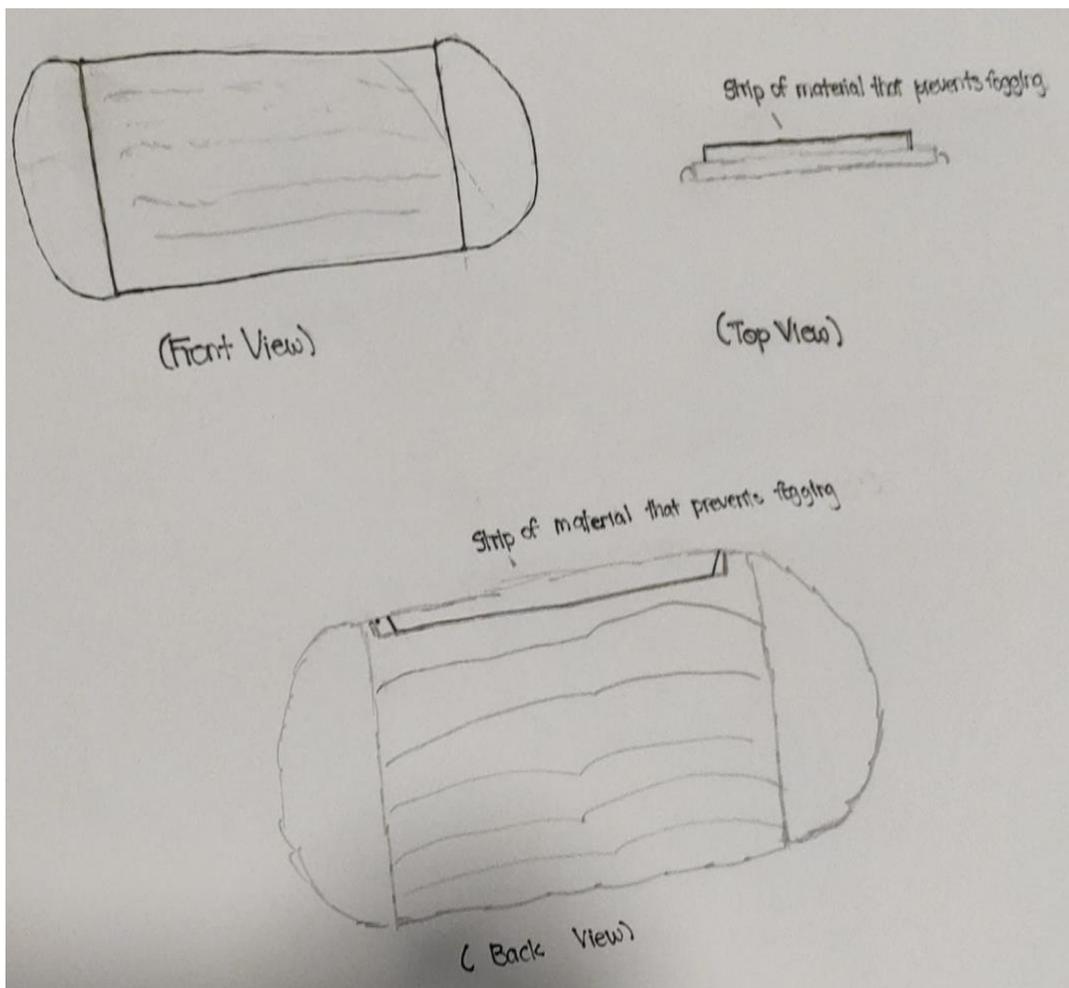
(Developing the idea....)

Write down your proposed invention and why you want to do it. State also how you think your proposed invention is better.

### 3A) Describe your proposed invention.

We will be using adhesive materials such as gelatin, acrylic and silicone tape to put on the inner side of the mask to seal the gap in between the mask and our faces. We will be investigating the optimal length of the seal to solve the problem too.

This is a rough sketch of the mask we are going to do:



**3B) Explain the purpose of your proposed invention and the potential benefits to users.**

Our proposed invention will be able to solve the problem of fogging of spectacles when wearing masks. As our target audience, Secondary One students, mostly wear glasses and the majority of them find the fogging of spectacles affecting them, our product will solve their problem at an affordable price.

**3C) In what ways would your proposed invention be different and/or better than existing solutions, if any?**

Our invention is better than existing solutions because the existing solutions are either costly, not appealing or not available in Singapore. The tape will be hidden from sight, so others will not be able to see it. The material to make the strip is cheap and not costly.

**3D) What are some problems you expect in the course of your proposed invention?**

We might have problems in the following areas:

- How do we put the materials we have chosen together with the mask?
- How to make sure that our prototype is better than the existing product?
- Where to purchase the materials we decided to use?

**3E) What and when are the major milestone (project timeline) in your invention?**

**February:** Problem research and survey

**March:** Proposal writing, ideation for solution

**April:** Proposal presentation, research on material

**May-June:** Material experiment, starting on prototype

**July:** Mid-term evaluation, continuation of prototype making

**August:** Finalization of prototype, logbook writing

**September:** Final evaluation preparation, product finalisation

***#must be able to be constructed based on current / emerging technologies must not violate the laws of Science or go against the laws of nature.***

## 4. Construction or Modelling Process\*

(This first... then that...)

You are now onto the fabrication of your prototype/ product. You need to select material and understand how to put them together so that your prototype/ product can perform its function.

### 4A) Explain how and why the materials were chosen for the prototype/ product of your invention

For the main material at the nose bridge, our main considerations are the adhesiveness, effectiveness, cost and comfort of the materials and the table below shows the comparisons between gelatin, silicone and acrylic.

Materials	Adhesiveness	Effectiveness	Cost	Comfort	Total score
Gelatin	2	4	4	4	14
Silicone	2	2	3	2	9
Acrylic	3	3	3	2	11

### 4B) Explore these considerations that may guide the construction of your prototype/ product.

We chose gelatin as our main material because of these reasons:

- Soft texture so your nose will feel comfortable
- Effectively prevents vapour from leaving the gaps between mask and our face
- Most gelatin does not produce much odour or harmful smelling air
- Easily adhesive just by sprinkling some water on the surface

### 4C) Document the prototype / product development stages. You may use drawings, photographs or videos.

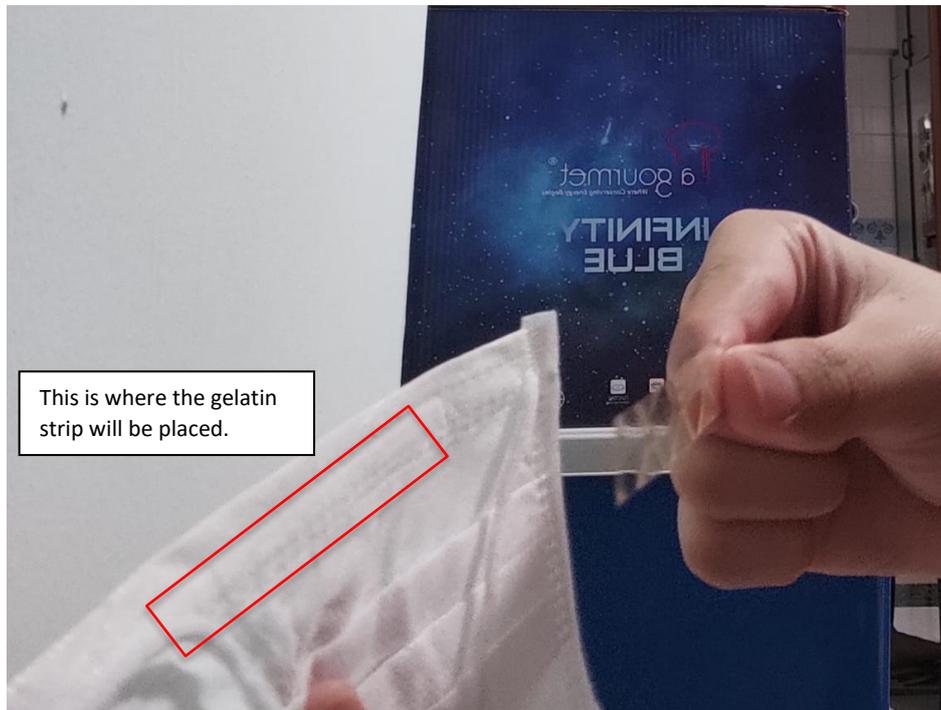
We have decided to investigate on 3 lengths of the gelatin strip, which are 3cm, 5cm and 7cm.

Firstly, we will find a disposable mask and a long gelatin strip.

Secondly, we will have to measure 7cm for the length of the strip for cutting. We have found out that the best length for comfort and preventing fogging is 7cm from testing out the lengths of 3cm, 5cm and 7cm.



Thirdly, we will be putting the gelatin strip on the top of the inner side of the mask where the nose bridge will be at.



Fourthly, sprinkle two to three drops of water and spread it on the gelatin strip.

Lastly, put on the mask, ensuring that the gelatin strip sticks softly on your nose and you are good to go.

This is the link of the video of our prototype testing:

[https://www.canva.com/design/DAEmnbxGGLo/Zav5JERk2-ulCsi7YGnQ1A/watch?utm\\_content=DAEmnbxGGLo&utm\\_campaign=designshare&utm\\_medium=link&utm\\_source=publishsharelink](https://www.canva.com/design/DAEmnbxGGLo/Zav5JERk2-ulCsi7YGnQ1A/watch?utm_content=DAEmnbxGGLo&utm_campaign=designshare&utm_medium=link&utm_source=publishsharelink)

**OR**

If construction of the prototype is not possible, then you have to create an animation / as a proof of concept that it can be applied in a bigger scale.

- 4A Explain why construction of a prototype is not possible and the proof of concept is needed in your case.**
- 4B Briefly explain how the video / animation can effectively show how your invention will work and the different considerations.**

**● References**

Read <http://www.bibme.org/citation-guide/apa/> on how to cite references.

**6A) Cite the references you have used for your project work. Your source of reference should come from different types (eg books, magazine, websites, journal articles, interview, photographs, product brochure, reviews etc.)**

<https://health.clevelandclinic.org/how-to-keep-your-glasses-fog-free-while-wearing-a-mask/>

<https://blog.marianinc.com/blog/choosing-a-medical-psa>

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<https://multimedia.3m.com/mws/media/11284820/3m-medical-materials-and-technologies-medical-oem-white-paper.pdf>

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<https://cool.culturalheritage.org/albumen/library/c20/kozlov1983.html>