

Hwa Chong Institution

Project Work

Category 3

Inventions Log Book

(Revised for 2020)

Title of Project: Saucy
Group Name: 3-10
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1. Problem Finding

(The beginning...)

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

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

-Difficulty in using the last drops of sauce/any viscous liquid in a bottle, convenience

-Environmental waste

-Some bottles are large and bulky, which means that bringing large numbers of bottles in a bag can be not very portable and uncomfortable

-All four of us have encountered instances where in a hawker centre or at home we want to have some sauce but the remaining sauce is ridiculously hard to get out

-Sometimes we carry a lot of bulky items in our bags, and it is extremely uncomfortable

FOOD WASTE - About 58,000 tonnes of ketchup is wasted annually.

PLASTIC WASTE-In Singapore, about 700 kg of plastic waste is discarded every year

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

-(In)convenience/(dis)comfort. Finding what is inconvenient can help us understand how to improve unfavourable conditions and thus it is one of the most important aspects when trying to come up with something new and supposedly better because you are trying to improve people's lives.

-Impacts on the surrounding, such as environmental impacts. Thinking about what (adverse) effects something has on the environment can help to give an idea on how to reduce the damage done to the environment. Although electricity has brought a lot of convenience, the process of burning fossil fuels for electricity has harmed the earth greatly.

-Feasibility. If a problem has no feasible solution, such as trying to come up with a way for humans to become immortal, it is not a problem to be dealt with.

1 C 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		
	Wastage of materials (pollution)	Difficulty in getting viscous liquids out of the container	Clothes wasted because they don't fit
Inconvenience	2	4	3
Harmful to the environment?	4	3	4
Feasibility	4	4	2
Total Score	10	11	9

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

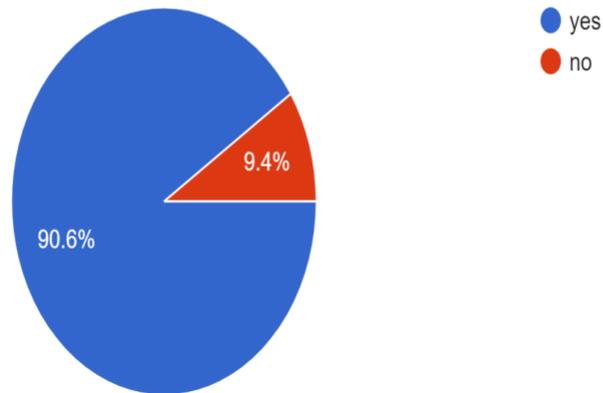
Now that the problem has been identified. It is important to gather information on the extent of the problem and/or evaluate the usefulness of existing solutions based on *some criteria*. You may need to conduct surveys and research on existing solutions.

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

It is extremely inconvenient when you want to have some sauce with your food, or you want to use the toothpaste in the tube. However, when there are very little of these viscous liquids left in their containers, it can be very annoying to get the sauce or toothpaste out. Many people, including the four of us, have experienced these before.

Have you ever encountered a situation where there is residue that you cannot get out, stuck in your bottle or tube?

32 responses

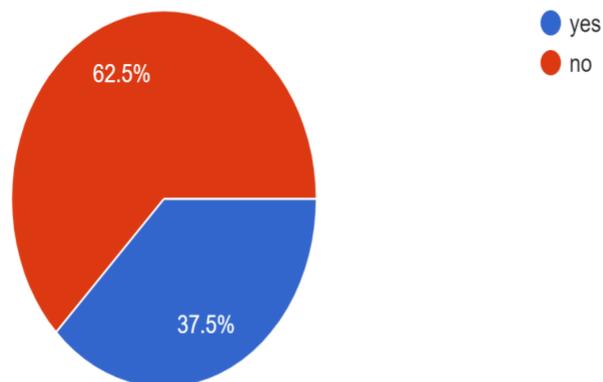


An overwhelming 90.6% of the respondents encountered a situation where there is residue viscous substance that they could not get out of the bottle or tube

There is a need to solve this issue as it occurs a lot

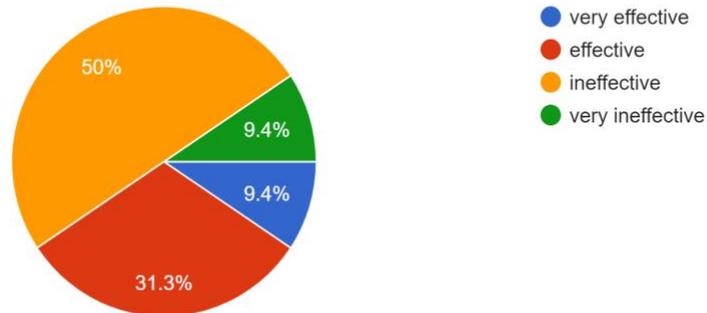
No matter how hard you shake/squeeze/hit the bottle/tube, does the residue sauce come out easily?

32 responses



Is your method effective to get all the sauce out?

32 responses



2 B Compare and contrast the existing or similar solutions.

There are methods to get sauce and toothpaste out of their containers, however these methods are quite troublesome and inconsistent. One common method would be to shake and hit the sauce bottle, however, when the bottle is quite empty, it can be very time consuming and inconvenient to try to get the sauce out.

Another common method was to dilute the sauce. However, although this may be effective in getting most of the sauce out, the quality of the sauce drops. For example, dilute tomato sauce would be tasteless as compared to undiluted tomato sauce.

One other method was to get the toothpaste out of its tube is to use a large clip to clip onto the toothpaste tube, and then slide the clip down the tube to push the toothpaste out. This method is effective, however it does require a clip large enough to cover the width of the tube.

Many people also try to use chopsticks to scrap the remaining sauces out. However this method is extremely tedious and time consuming.

There were also some solutions to get all toothpaste and sauce out of the container. One such solution was LiquiGlide, a coating agent that makes sauces slide out easily. However, LiquiGlide is expensive because it has to be custom made.

Another such product was the tube roller. The tube roller compresses the tube and makes the substance inside flow out. However, the tube roller is restricted to tubes only, mainly toothpaste. It does not help to reduce plastic waste as the tube would still have to be thrown after use, and the contents in the tube cannot be fully removed.

3. Your BIG IDEA# (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.

3 A Describe your proposed invention.

A refillable syringe-like container syringe that can contain viscous sauces and dispense all of it in one swift push without leaving a single drop of residue. It will be more effective than current sauce bottles in pushing out different types of viscous liquids that would be otherwise extremely difficult to not waste any of. The syringe has a cap in order to keep the syringe from leaking out unintentionally. The syringe can come in different sizes to hold different amounts of sauce/toothpaste. The product will come with the sauce/toothpaste already inside.

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

- To help users get the sauce/toothpaste out of their containers more easily
- Reduces sauce/toothpaste wastage
- Help ensure that all viscous substances can be removed from the syringe-bottle **EFFICIENTLY**

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

- It is cheaper than other effective solutions
- more effective than manual methods
- It can be used for all viscous substances

<p>COMMON CRITERIA: EXISTING SOLUTIONS:</p>	<p>Reusability (1-Very Reusable 5-Not reusable)</p>	<p>Price (1-Cheapest 5-Most expensive)</p>	<p>Effectiveness of product in reducing waste (1-Very effective 5-Not Effective)</p>
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LiquiGlide	5	5	1
Tube Roller	1	1	4
SAUCY	1	2	1

COMMON CRITERIA: EXISTING SOLUTIONS:	Ensuring product quality (1- Allowed content's quality not to be affected 5- Affected content's quality severely)	Effectiveness of effort used: (1- Very effective 5- Wasting effort unnecessarily)
1. Diluting the sauces	5	1
2. Using a chopstick to scrap out the remaining sauce	1	5
3. Turning the bottle upside down	1	5

SAUCY	1	1
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3 D What are some problems you expect in the course of your proposed invention?

-modifying and improving our product, figuring out small details that would make it more effective/easier to use

-agreeing with everyone what the invention can do and how we will face these problems

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

-when we finish the planning how the invention will look like and all its features and functions

-finishing the prototype

-when the prototype works and functions well

#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. Proposed 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.

Plan of construction stages

1. Get syringes
2. Modify syringes (make indents, enlarge dispense hole, etc)
3. 3D print out components (eg. lock feature and cap)
4. Combine the syringes and their different components

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

-Plastic syringe for main body as it is waterproof so that the viscous substances in the syringe will not damage or seep out of the syringe

-Glue to assemble the main components

-3D print filament to make the other components (e.g lock, cap)

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

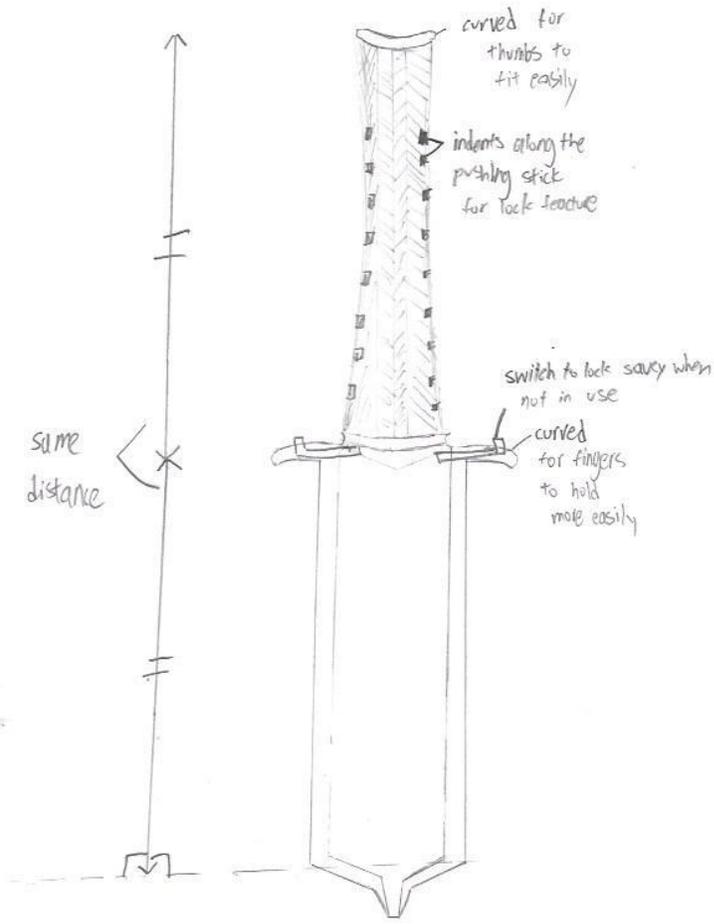
-features to make sure that the sauce does not spill/get squeezed out accidentally

-features to store the product easily

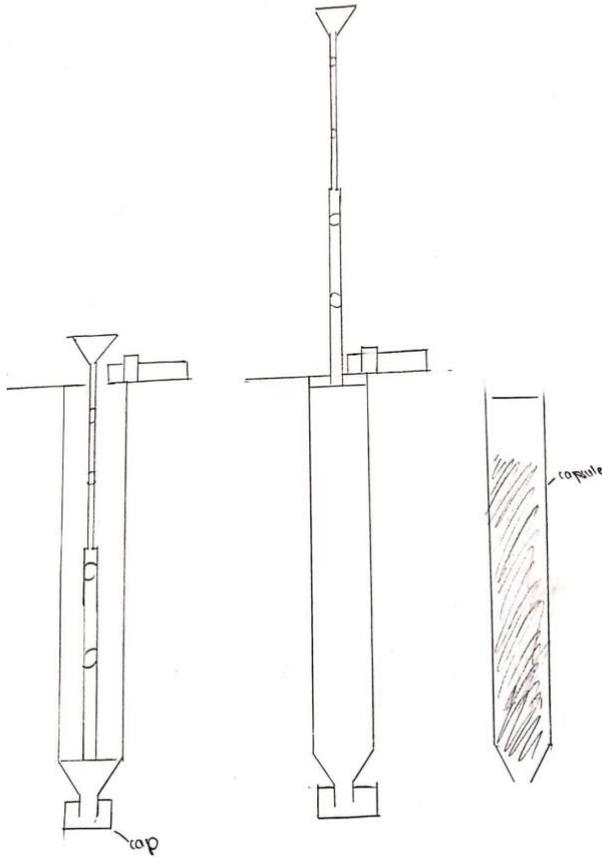
4 C Propose how the prototype/ product will be constructed or developed. You may use drawings and photographs.

1. Extendable and detachable plunger (To save space and reduce plastic waste)
2. Cap with larger and flatter base (To balance syringe better)
3. Lock Feature (Holes added to the plunger so as to slide the rod in and prevent accidental spillage)
4. Varying sizes for different purposes.

For example, a toothpaste syringe will be smaller than a ketchup syringe. (e.g. Syringe size for ketchup= approx. 2.5x2.5x8.12 inches, which is similar to the size of a Heinz glass bottle)



First sketch



Second sketch

<https://youtu.be/5yvd4aN4eg8>

This is the link to our Concept testing video, showing that our idea works for viscous substances.

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.

Due to COVID-19, many of the supplies could not be obtained as many government measures were implemented such as safe-distancing measures and circuit breaker, which made it extremely difficult for us to obtain the necessary parts we needed for the construction of our prototype

4B Briefly explain how the video / animation can effectively show how your invention will work and the different considerations.

It has similar concepts to that of a syringe except that it has more features and it enables the syringe to be used not just for medical purposes.

Our syringe will have a larger opening to dispense substances smoothly and efficiently.

Warning:

- *Video / animated simulation only if prototyping is absolutely no possible.*
- *Video / animated simulation must be logical and convincing that the invention works.*
- *Constraints must be clearly included in the logbook or the project will be heavily penalized.*

5. References

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

6 A 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.)

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