

Hwa Chong Institution
Project Work
Category 3 Inventions Log Book

Title of Project: Innovative Walking Stick
Group Name: 3-36
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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 like 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.

1. Even though there are some lampposts at night, it may still be dark outside. This will result in the disabled unable to see if they are doing activities at night, resulting maybe into an accident if the disabled cannot see any obstructions at night.
2. It may be troublesome to hold the walking stick with a torch simply attached to the stick via a string or a rubber band. For example, it is troublesome for the user to bend forward and press the many buttons so that they can control the light on the walking stick. An elderly user's hands are no longer nimble to click on the many buttons on a light. It is also unfeasible to place the light on the handle, as this will obstruct the cushioning on the light bulb.

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

1. (Poor visibility) As it is mostly dark at night, adding on to the fact that some of the users have poor visibility, especially at night, hence they may knock over or trip over items in darkness. In addition, if the walking stick is not with the user, he may not be able to locate the stick when it is dark.
2. The user may have difficulty carrying items with him with the walking stick. It is inconvenient and impractical for the user to hold the walking stick on one hand and his other hand holding other bulky and heavy objects. If he were to use a hook to hook the bags on the walking stick, the user would have to use even

more energy to lug the heavier weight of the walking stick to move around, hence disallowing him to move far distances.

- 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		
	#1 Unable to move above elevated platforms easily with wheelchair	#2 Unable to see clearly when walking at night	#3 Lugging a heavy load everytime the user walks
Consideration 1 Scale of problem	4	3	3
Consideration 2 Validity of problem	4	4	3
Consideration 3 Feasibility	2	3	4
Consideration 4 Cost	2	3	3
Total score	12	13	13

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)

We have found out that just over 6.8 million community-resilient Americans use assistive devices to help them with mobility. This group already consists of 1.7 million wheelchair users and 6.1 million users of other assistive devices such as canes/walkers.

2 B Compare and contrast the existing or similar solutions.

Current walking sticks have non-rechargeable batteries and needs new batteries to work. This in inconvenient as taking out the battery in and out uses quite a bit of time, and the battery may run out anytime when the walking stick is in use.

Current walking sticks also texture small wheels/wheels that are unable to support the user in case of a fall. This has been quite a problem as the wheels are not big enough to keep the stick balanced and supporting the user, hence causing falls.

Current products also are often heavy and are not durable. This causes the walking stick to become very bulky and cannot be transported from place to place conveniently, as well as the user having top carry a heavier load to walk. The walking stick is also easily broken and cannot be used for a long time.

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.

We will be inventing a special walking stick, which has larger wheels installed with a brake. There will also be an LED light installed to the walking stick, with a solar panel to recharge the energy inside for the torch. We also have a turner to adjust the height of the walking stick to suit users of different height.

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

This walking stick can help the elderly and others who need it for walking and other daily purposes. This walking stick is good for people who like to go for a walk in the evening, as well as convenient as the energy from

the Sun will be absorbed by solar panels to recharge the battery for the torch which will be used at night. The stick is also suitable for other people's needs should they require them.

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

We have a light installed to the walking stick to illuminate the way in the evening, making the road more clearly, allowing the user to find their way to their destination, even those with bad eyesight. We also have added in four wheels to make the stick a lot more portable and convenient for the user, as there is no need to carry the walking stick. We also have a turner to adjust the height of the walking stick so that any user would be eligible to use this walking stick. Our walking stick is also lighter than most walking sticks.

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

- The wheels may not be able to support every single user's weight.
- The brake may be unable to stop the wheels in time.

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

January – February: Forming of project group and seeking mentorship

March: Researching of problem

Early April: Sketch of prototype complete

Late April – End May: Material research (for 1st prototype)

June Holidays: Construction of 1st prototype

Early July – Improve on the revised prototype based on the 1st prototype

Mid July – Early August: Preparation for final evaluation

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.

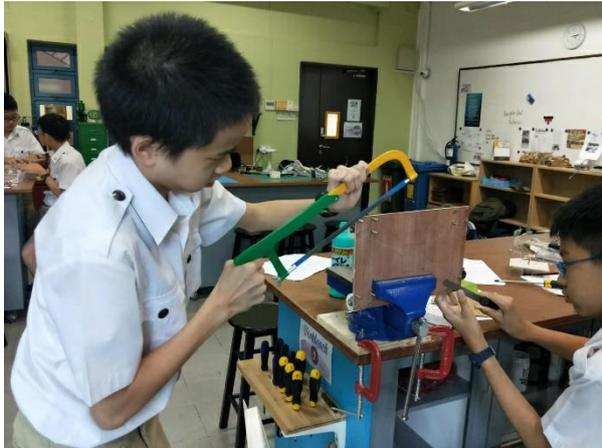
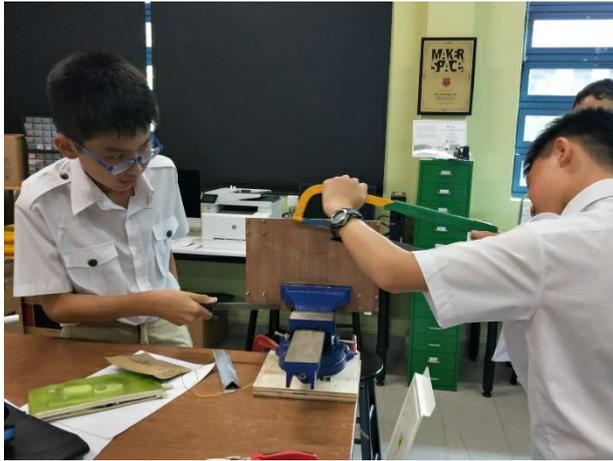
4 A Explain how and why the materials were chosen for the prototype/ product of your invention

For the 1st walking stick, we have chosen a curtain rod as the material is sturdy (made of metal) as well as bendable so that we can make adjustments to it. The rod is also lightweight, and the spring inside can be used to extend the stick to fit the person's height. For the revised edition, we had used a premade stick that was stiffer, but had holes for the turner installed already. For the wheels, we had used wheels made from plastic and also a light mounted along the shaft of the walking stick.

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

The stick has to be lightweight so that it would not be cumbersome when moving it around from place to place. The handle should also have a grip so that the user would be able to hold on to the stick comfortably. It must also be able to support a heavy weight so that it would not break even when the user exerts a lot of force onto the walking stick, especially the wheels. The wheels should also not break like the stick.

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



5. Modification and Evaluation

Upon the completion of your prototype/ product, you would need to see if it is working the way you want it to work. Check if your product has met the identified purpose and the user's need; and implement necessary modifications and improvements. This process may take several rounds.

5 A Write down your prototype/ product test criteria and check against it if it works. Identify areas of weakness for modification. Indicate the test iteration and date of test.

Test Iteration:	Tick			Remarks
Test Date:	Pass	Fail	Potential Failure	
Test Criteria 1	<input checked="" type="checkbox"/>			

(if wheels can work properly)				The wheels can roll properly but bend slightly if there is a heavy weight on it.
Test Criteria 2 (if LED system works)	<input checked="" type="checkbox"/>			The LED can be efficiently powered by the solar panel and is able to produce enough light when turned on.
Test Criteria 3 (if brake function works properly)	<input checked="" type="checkbox"/>			The brake can efficiently brake quickly most of the time.
Test Criteria 4 (if turner is able to adjust)	<input checked="" type="checkbox"/>			The turner is able to adjust up to most of the average heights the elderly has.

*Add more rows for more criteria

** Repeat table for next test iteration

6. 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.)

Proposal Evaluation

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Mid-Term Evaluation

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- (slide 8 picture walking stick with wheels) walking stick with wheels - Google Search. (2010). Retrieved July 3, 2019, from Google.com website: <https://tinyurl.com/y4369q63>
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Final Evaluation

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