

• **PROJECT WORK**

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Category: Cat 3 Inventions

Mentor: Ms Zuliawati

Title of Project: R&R
Group Name: Inventors
Group Members: 1) Li Zhi He 2) Chin Yao Lok 3) Toh Zheng Kai 4) Wayne Ang

## 1. Problem Finding

(The beginning...)

Identify a problem you would like to solve. You may want to 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.**

- 1) The first problem is that many elderly people face difficulties carrying their things around. They might not have the support or strength to carry heavy objects alone. We have noticed this as a group many times in our daily lives.
  
- 2) People, especially students, do not get enough sleep to have energy for the day's activities and lessons, due to the overwhelming amount of homework. We have noticed our friends facing these difficulties and experience it ourselves too.
  
- 3) The last problem is that many people find it hard to find a seat outside, when they are currently not engaged in any activities and might be tired after standing for so long. We can usually see this when parents are waiting to pick up their children from school.

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

1. Extent of Problem (Current Society).
2. Opinion of students within school community (poll)

**1 C** List some problems your group would like to solve. List also the considerations for selection of problems 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	#2	#3
	<p><b>many elderly people face difficulties carrying their things around</b>  <a href="https://www.straitstimes.com/singapore/close-to-10">https://www.straitstimes.com/singapore/close-to-10</a></p>	<p><b>do not get enough sleep</b>  <a href="https://cنالifestyle.channelnewsasia.com/wellness/sleep-tips-insomnia-singapore-philips-global-survey-237866">https://cنالifestyle.channelnewsasia.com/wellness/sleep-tips-insomnia-singapore-philips-global-survey-237866</a></p>	<p><b>find it hard to find a seat outside</b></p>

	<b>0000-residents-have-trouble-with-basic-tasks)</b>		
Extent of Problem (Current Society)	<b>11.2 % of elderly face mobility problems.</b>	<b>Only less than half of the respondents in Singapore feel that they get enough sleep at night, and only 21 percent feel well-rested most of the time when waking up in the morning. Close to three in 10 Singaporeans also say that they now sleep less each night.</b>	1)NIL 2)Problem is not one that is commonly faced nationally or as widely discussed
Poll	26.7%	66.7%	6.7%
Points	1, 2	3, 3	2, 1
Total Score	<b>3</b>	<b>6</b>	<b>3</b>

**#Problem 1:**



But here's the catch: It doesn't mean we're sleeping *better*. In fact, close to 60 per cent of Singaporeans' ability to sleep well has been directly impacted by the pandemic. And more than a third experience negative impact on their stress levels, ability to sleep well, mental/emotional health, sleep and work routines.

#### MORE HURDLES TO A GOOD NIGHT'S SLEEP

Close to three in 10 Singaporeans say that they now sleep less each night. More specifically, Singaporeans average 6.8 hours of sleep per night, down from seven hours during the previous survey released in 2020. According to the National Sleep Foundation, those aged 18 to 64 need seven to nine hours of sleep.

### #Problem 2:

#### THE STRAITS TIMES



In total, 150,000 households were surveyed for the 2020 report.

Out of the 97,600 residents who experienced difficulties across six domains - seeing, hearing, mobility, self-care, communication, and concentrating or remembering - 69,400 were aged 65 and older, or 11.2 per cent of all senior residents.



The census also showed that about nine in 10 senior residents live with other people, such as a spouse or a child.

#### WELLNESS

Nearly 6 in 10 Singaporeans aren't sleeping well because of COVID-19, study confirms



### **READ: Why snoring loudly could be linked to heart disease, hypertension or worse**

It is no wonder that only less than half of the respondents in Singapore feel that they get enough sleep at night, and only 21 per cent feel well-rested most of the time when waking up in the morning.

## 2. Define the Problem

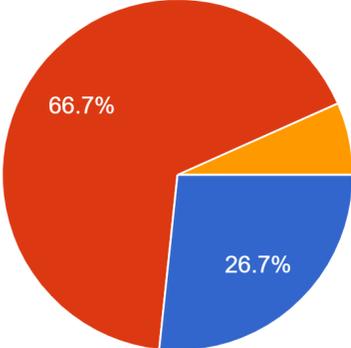
(This is one...)

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.

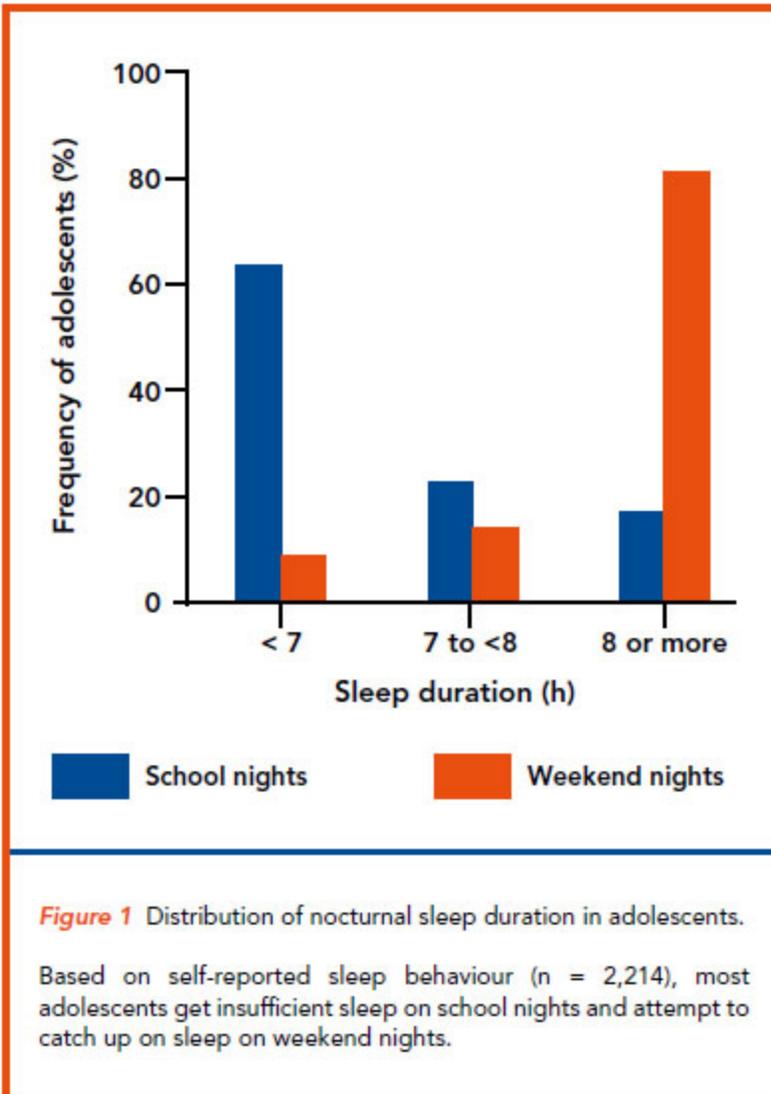
### 2 A Extent of problem (Research and discuss the problem and write down the problem statement)

Which is the one you think is the most pressing?

15 responses



- Many elderly people face difficulties carrying their things around
- Do not get enough sleep to have energy the next day
- Many people find it hard to find a seat outside



Based on data collected in Singapore, about 80% of adolescents report getting less sleep than what is recommended by the NSF.

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

Some existing solutions include (1 is on top left, 2 is on top right, 3 is bottom left, 4 is bottom right)

- 1) Bucky 40 Blinks No Pressure Beauty & Travel Eye Masks
- 2) OSTRICH PILLOW ORIGINAL Travel Pillow
- 3) Regular travel pillows for flight
- 4) Ikea's pillow that can be converted into a quilt from a pillow



### 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.

Our proposed invention is R&R, Rest and Relax. This invention is a pillow contraption which allows users to rest on it especially when they are outside of their house and need a place to take a break. R&R requires a wall for it to work, where the contraption will stick onto the wall using strong suction cups. The suction cups would be connected to a plank of light plastic. The pillow, which is connected to both the plank of plastic and the extendable contraption (which has very similar properties to a measuring tape) -- it can be locked in place to the specified length. When the length of the extendable contraption is longer, there would be a greater angle of tilt of the pillow and the pillow connected by a clip would be slanted to give the head a resting posture that is best suited to the user's needs. Hence, the user would be able to adjust the pillow to the perfect angle for his head to lay on. This invention would allow the user to rest against a comfy pillow which sticks strongly onto a wall surface, when he/she is outside and is finding a place to rest where there is a wall.

**\*Here's how the extendable contraption works:\***

It is very similar to how a measuring tape or an extendable table works. First, there is a plastic plank which has a space in between for two more plastic planks to fit in it, and the bottom of the planks are empty. When the user pulls out one of the planks to extend the length, he/she can lock the contraption and extended plank in place with a lock at the bottom of it. They are also able to slide very easily with a roller to enable the planks to be able to extend out easily for a seamless user's experience.

Similar videos showing roughly the same concept:

 [BJURSTA Table - IKEA Home Tour](#)

 [Inside the Humble Tape Measure](#)

*(Citations at the back)*

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

This is to provide more comfort for people who wish to rest on hard surfaces such as the MRT walls etc. Also, this will be very convenient for people to rest their heads and minds when they are on the way back home or to school. As this is a portable item, this will be very convenient to carry around. When they are at school, these students also can enjoy this item by simply sticking it onto the table or even using it lying down on the benches.

Thus, with this product we hope to be able to achieve our aim of giving our users a well-deserved break almost anywhere they go!

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

It would be better because it provides more support for the head and provides a comfortable cushion to rest your head on, unlike the other solutions which only focus on making the eyes and face comfortable.

Some Problems with these other products:

- 1) Most of the neck pillows that we use in air travelling don't do much to help support and comfort the head.
- 2) The IKEA pillow that can turn into a quilt does not have enough support and it can slip off against a vertical surface, and when being used as a quilt, movement is obstructed in the train if you want to alight at a particular stop. Putting on the quilt will be very troublesome too.

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

May face problems sticking to the surfaces, suction cups not strong enough

Some problems with our idea:

- 1) Compactibility of the device
  - Make it smaller with the compartments so that it is easy portability
  - Make it able to be kept and foldable
- 2) People forgetting to get off on the stop
  - Vibration to make the people wake up when their stop arrives
  - AI to indicate when you have reached your stop and what is your destination
  - Headphones in the device so that the alarm can get through the earphones
- 3) Drooling (Most likely cannot be solved)
  - Make the sheets washable and changeable
- 4) Product getting stuck to the window/surface when getting off their stop
  - Being able to connected to the user's phone and reminding them

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

6 April: Proposal

End of April: All materials needed obtained

End of May: Prototype done

End of July: Final Product done

12/16 August: Written Report

18 August: Final Evaluation

***#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.

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

1. Plastic Planks - strong and not very heavy (allows for easy user movement)
2. Pillow - soft and comfy to give the user a comfortable experience
3. Clip- to support and join/connect the planks together strongly
4. Suction cups - strong and allows our resting product to stick to the surfaces properly

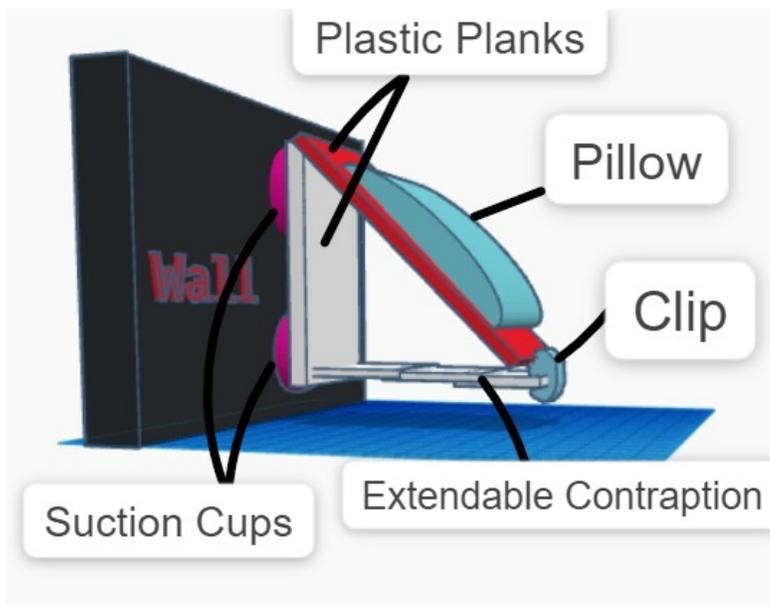
### **4 B Explore these considerations that may guide the construction of your prototype/ product.**

As our product is meant to be simple and lightweight, we have to ensure that we give the maximum efficiency of our product and with the simplest materials at the same time. Also, as we have to ensure that our selection of materials chosen here are simple in reach for us, as we have limited ability in terms of acquiring materials, so we chose simple materials that can give us maximum efficiency of the product. For instance, the plastic planks and the suction cups are rather simple, but this gives us our essential purposes of supporting it to the surfaces.

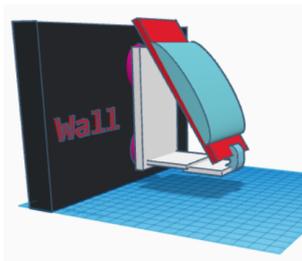
**4 C Propose how the prototype/ product will be constructed or developed. You may use drawings and photographs.**

Suction cups will be sticking onto the wall/ surfaces, and will be connected to a plank of plastic which would then be joined at the bottom to an extendable contraction. This contraction is clipped to the edge of the plank supporting the pillow, and thus the angle of the pillow would follow the length of the extendable contraction, when it becomes shorter or longer.

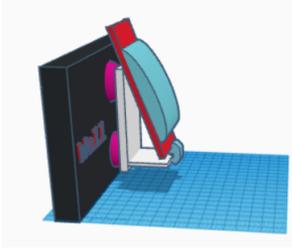
(All the rest of these pictures are screenshots of the website that is used in our project)



Shorter → steeper angle:



Shortest → Steepest Angle:



**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 on 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, the construction of a prototype has been delayed, and the meeting up of the group and the mentor was quite difficult due to the tightened gathering restrictions. Also, the school has not made the construction of a prototype necessary, and since the Phase 2 HA (Heightened Alert) came into Singapore just a few days before the Final Evaluation of the project work came along, we had no opportunity to meet in person and craft out the prototype.

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

This 3D animation will show the following of the things:

- The basic shape, structure of our proposed invention
- The considerations for our proposed invention
- Special functions, uses and shot demonstrations of the usage of the product where appropriate

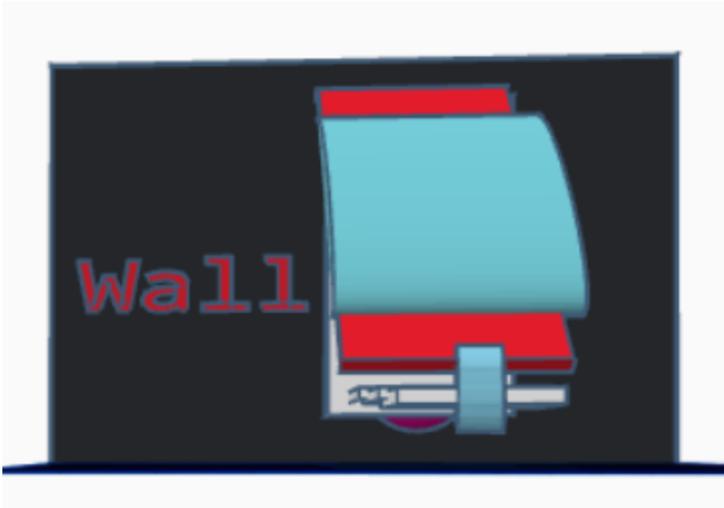
**\*We have some constraints with working on our animation of the prototype. Here are some of the constraints that will be listed out below\***

- 1. Due to the website constraints, we cannot show in the animation how the product moves (with the extension of the pillow side mentioned in section 3A earlier) and we can only show the basic structure of the prototype in the following pictures below.**

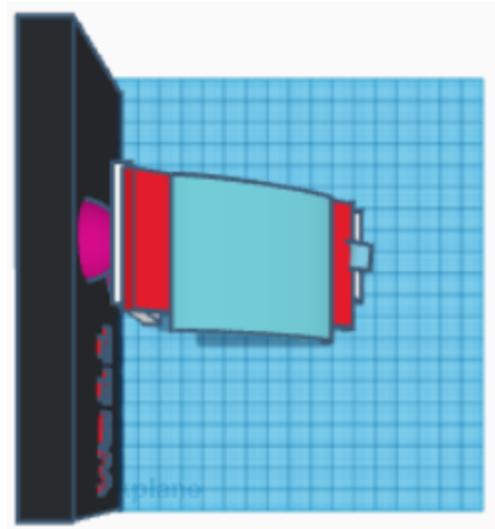
3D Prototype:

Front View:

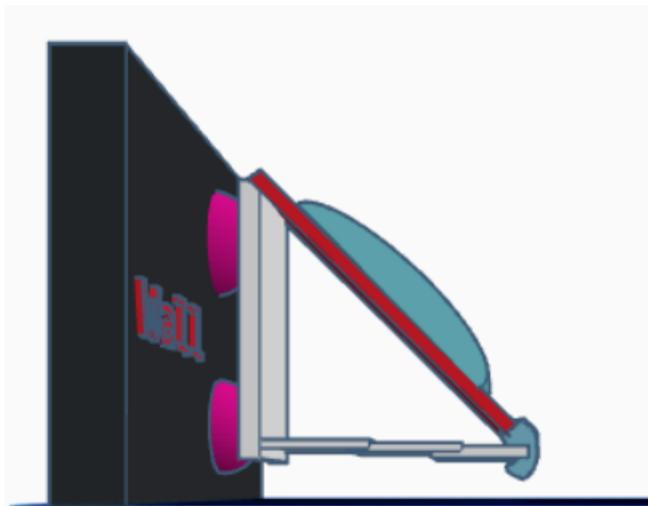
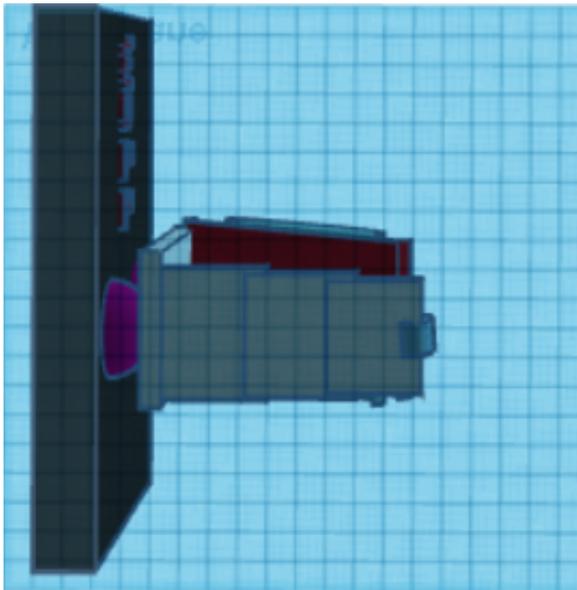
Top view:



Bottom view:



Side view:



**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.

- 5 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.)

*Sleep in adolescents* [Photograph]. (2018, March 1). SingHealth, Singapore.

What Do We Know About Sleep In Adolescence? (2018, March 1). Retrieved from

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<https://www.amazon.com/Bucky-Ultralight-Comfortable-Contoured-Extensions/dp/B01C2ZPGTU>

From mind to design in minutes. (n.d.). Retrieved from

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(This is the website which we did our 3D prototype design on)

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IKEAUSA. (2014, April 01). Retrieved August 16, 2021, from

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<https://i.pinimg.com/originals/d4/6a/ed/d46aed424b1f20be16b58c291db8ceae.jpg>

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