

**Hwa Chong Institution**  
**Project Work**  
**Category 3**  
**Inventions Log Book**  
**(Revised for 2020)**

Title of Project: Ellen
Group Name: 3-42
Group Members: 1)Ng Sheng Feng 2i1 2)Rexton Teoh 2i1 3)Ryker Tan 2i1 4)Dylan Lee 2i1

# 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.**

Our first problem identified are the elderly slipping and falling at home with nobody helping them. This problem was identified due to many newspaper articles reporting elderly getting injured at home, especially with the aging population.

Our second problem identified are youth who do not know how to recycle, frequently throw wrong items into the wrong recycling bin. This is raised due to climate change accords and demonstrations.

Our last problem identified is myopia, with many children not knowing how to take care of their eyesight properly. This is prevalent since there has been a sharp increase in students wearing glasses in school.

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

Our first consideration is to what extent does this problem affect people? If this problem only affects a small community then the benefits could be too limited.

Our second consideration is, is it possible to address this problem? If the problem is too big we might not be able to invent something to solve the problem.

Our last consideration is are there existing solutions to this problem? If there are already solutions then there is no point in inventing something new.

**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 Phone Addiction	#2 Myopia	#3 Spinal Problems
Consideration 1 Feasibility (5=very feasible, 1=unrealistic to solve)	2	4	2
Consideration 2 Scale of Problem (5=very widespread problem, 1=obscure problem not many face)	5	5	3
Consideration 3 Availability of Existing Solutions	3	3	4

(5=rarely solved problem, 1=commonly solved problem)			
Total Score	10	12	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)

Although myopia rates in Singapore are decreasing, they are still quite high. As such, how can we create a cost-effective yet efficient solution to combat this problem?

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

Lux meter used to measure light is quite bulky and hard to use  
 There are phone apps but the user has to download to use, and thus is not that effective  
 As of now, no one has built a sensor to test for light for our purpose (helping eyesight)

## 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.

### 3 A Describe your proposed invention.

Our invention is a portable light sensor which will sense the light in a room for different purposes. If the light is not bright enough, the LED light will change colour from green to red. Once the room is bright enough, the colour will change back from red to green.

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

Our purpose is to help more students protect their eyesight as we realised that an increasing number of students in Singapore have developed myopia, therefore our proposed invention can improve the lighting students use, resulting in the decreased number of myopia cases in students

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

Our invention will be designed to increase efficiency and ease of use, simplified for our target audience, students

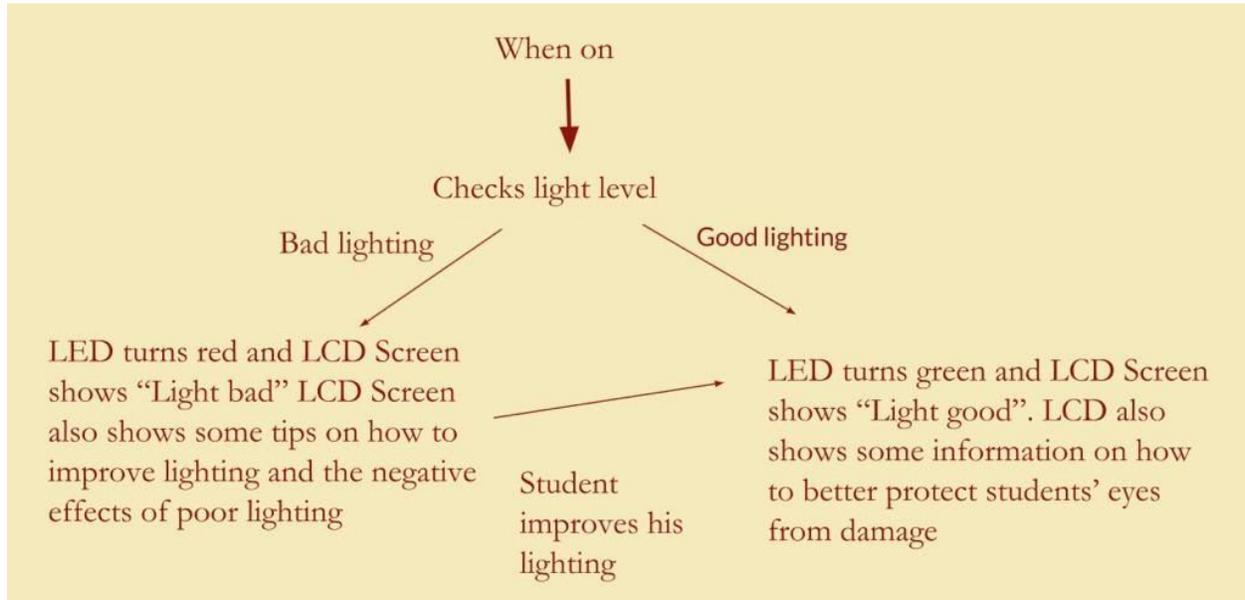
### 3 D What are some problems you expect in the course of your proposed invention?

One problem is that it might be hard to design different light settings for different activities. Additionally, it would be hard to try to designate a suitable light range as there might be discrepancies.

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

The first major milestone would be by June to finish our prototype design and the second by August to complete our prototype.

### Flowchart for how our product works



***#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**

Corn plastic was originally used for our prototype as it is quite a sturdy material and is biodegradable, a better alternative to plastic. However, we decided cardboard to be used for our final product as it is also biodegradable and is much easier to yield into desired shape. We used arduino to code the light sensor as arduino has more features that we can use for it.

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

We desire to make it as environmentally friendly as possible, as cheap as possible so it is easily accessible and making it as user-friendly as possible such that users can understand and use our product with ease

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



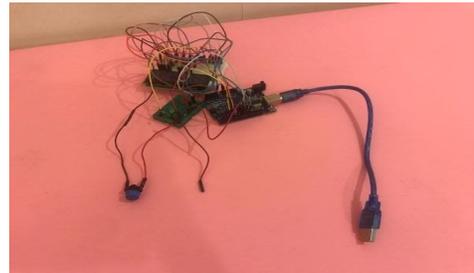
LCD Screen



Arduino buttons



LED lights



**Skeleton Arduino (75% complete)**

## 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.)**

1. Government of Canada, Canadian Centre for Occupational Health. (2010, July 12). The Young Workers Zone : Teaching Tools : Physical Hazards: Lighting. Retrieved from [https://www.ccohs.ca/teach\\_tools/phys\\_hazards/lighting.html](https://www.ccohs.ca/teach_tools/phys_hazards/lighting.html)
2. Lux Light Meter for Photography Grow Plants Led Photometer Lighting Intensity Brightness Measurement Pocket Digital Photo Illuminance Sensor. (n.d.). Retrieved from [https://www.amazon.sg/Photography-Photometer-Brightness-Measurement-Illuminance/dp/B07S376KRB/ref=asc\\_df\\_B07S376KRB/?tag=googleshoppin-22&linkCode=df0&hvadid=404232921544&hvpos=&hvnetw=g&hvrnd=5332141157660482196&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmld=&hvlocint=&hvlocphy=9062531&hvtargid=pla-870457313024&psc=1](https://www.amazon.sg/Photography-Photometer-Brightness-Measurement-Illuminance/dp/B07S376KRB/ref=asc_df_B07S376KRB/?tag=googleshoppin-22&linkCode=df0&hvadid=404232921544&hvpos=&hvnetw=g&hvrnd=5332141157660482196&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmld=&hvlocint=&hvlocphy=9062531&hvtargid=pla-870457313024&psc=1)
3. How Lighting Affects Your Mood and Productivity. (2019, June 27). Retrieved from <https://www.lights.com/how-lighting-affects-mood-productivity>
4. Myopia (Nearsightedness). (n.d.). Retrieved from <https://www.aoa.org/patients-and-public/eye-and-vision-problems/glossary-of-eye-and-vision-conditions/myopia>
5. Childhood Myopia // . (n.d.). Retrieved from <https://www.singhealth.com.sg/patient-care/patient-education/childhood-myopia>
6. Knapton, S. (2015, April 2). Watching TV or staring at computer for hours 'does not cause short-sightedness'. Retrieved from

<https://www.telegraph.co.uk/news/science/science-news/11512430/Watching-TV-or-staring-at-computer-for-hours-does-not-cause-short-sightedness.html>

7. Myopia (Nearsightedness). (n.d.). Retrieved from <https://www.aoa.org/patients-and-public/eye-and-vision-problems/glossary-of-eye-and-vision-conditions/myopia>
8. RF Wireless World. (n.d.). Retrieved August 08, 2020, from <https://www.rfwireless-world.com/Terminology/Advantages-and-Disadvantages-of-Light-Sensor.html>