

## **CAT 4 RESOURCE DEVELOPMENT**

**Group 4-084**

### **Going Green With A Smarter Singapore**

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## **1. ABSTRACT**

Going green with a smarter Singapore is a project dedicated to help secondary school students know how to make Singapore greener and smarter. Through the use of our resource package, we hope to educate teenagers on the importance of the Singapore Green Plan 2030 (SGP), which is a whole-of-nation movement to advance Singapore's national agenda on sustainable development, give them tips to make SG a greener and smarter city as well as some facts about the Singapore Green Corridor(also known as the Singapore Rail corridor). Our resource package comprises an Instagram page and an interactive website which contains information about the SGP, Singapore Green Corridor, tips and benefits from ourselves, a Kahoot! quiz, a crossword puzzle and a good selection of videos and reading materials. Our variety of resources are easier to understand, hence it will attract teenagers to visit our website.

## **2. INTRODUCTION**

## **2.1 Rationale**

After finding out about the Singapore Green Plan (SGP) that will be released in 2030, our group decided to do something related to it and promote the SGP. We also want to implement more ideas from other countries and from ourselves to make Singapore an even greener and smarter city.

The Singapore Green Plan 2030, or the Green Plan, is a national movement aimed at advancing Singapore's sustainable development. Singapore hopes to take firm actions against climate change. We planned to focus on the two objectives of SGP which are "City in Nature" and "Sustainable living". (This is our main objective of our project)

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## **2.2 Objectives**

The objectives of our project were to

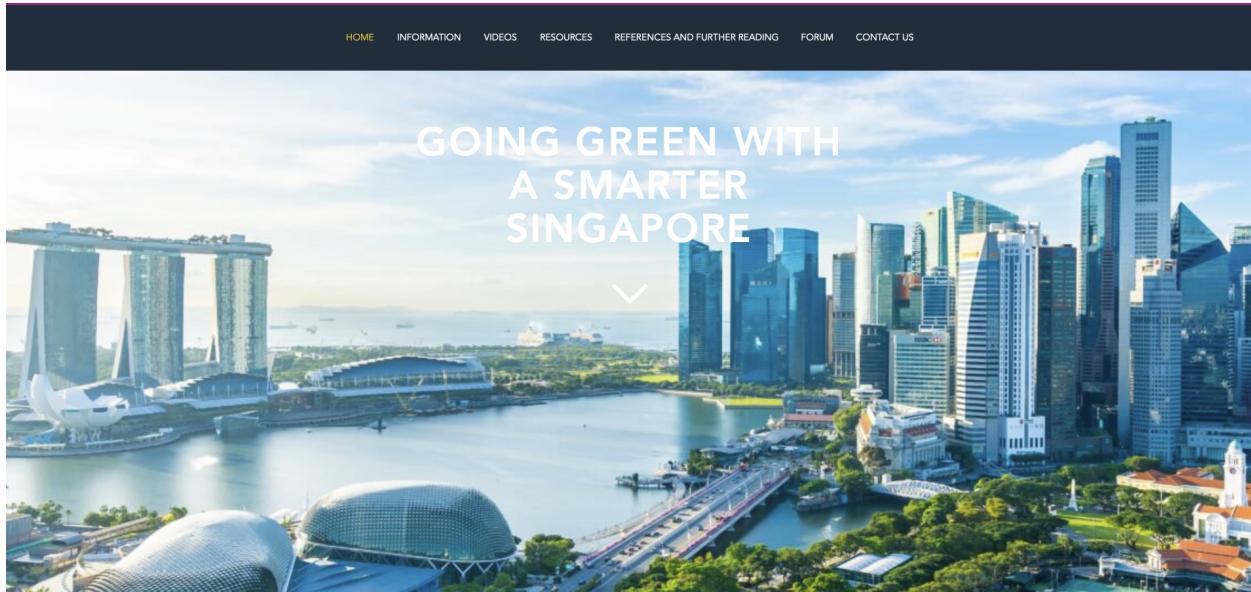
- understand the importance of the SGP.
- educate teenagers on SGP and give them tips to make SG a greener and smarter city.
- practise what they have learnt at home and in school.
- introduce the green corridor to students

## **2.3 Target Audience**

The target audience were teenagers aged 14 to 16.

## **2.4 Resources**

We have a variety of resources such as an Instagram page, a website containing information and articles related to our project, a Kahoot! quiz , a crossword puzzle, videos and further reading materials.



### 3. REVIEW

#### 3.1 Existing Online Resources

There were many websites such as official government websites promoting the need to go green. However, information about going green using technology is not consolidated in a single website.

At the current moment, the resources available for teenagers to look at are Government websites or random websites on the internet. Our interactive elements complement the existing online resources and make the information more enjoyable to read for teenagers as the interactive elements will keep them engaged with the information. Information from official government websites and other websites are also all scattered around the internet, making it hard for teenagers to find and access the information. Furthermore, most of the information about going green is not linked to going smart or

they do not tell teenagers how to go green with going smart. This makes our project very useful and different from all those out there as we have all the essential information and resources targeted at teenagers aged 12-14 all in a website.

### **3.2 Literature Review**

#### **3.2.1 “New green corridor to connect Singapore's three national gardens”**

According to the Straits Times, the Green Corridor is built to connect Singapore's three national gardens in the coming years. Construction for the first phase, a 1.4km elevated linear park that will lie above the canal between Bukit Timah and Dunearn Road, will begin in 2021 and will connect to existing overhead bridges as well as the Rail Corridor near the Bukit Timah Railway Station node. There are also plans in the future to extend it to Kallang Riverside Park. The Green Corridor is part of the City in Nature scheme that we are targeting to educate the teenagers about.

#### **3.2.2 “What is a smart city? Technology and examples”**

According to the article, a smart city is an urban area that uses different types of electronic methods and sensors to collect data. It tells us that a smart city is able to use technology to provide services and solve city problems such as global warming etc. It also tells us what makes a smart city successful and gives us some examples of a successful smart city. A solution from this article that I think Singapore could adopt is “Midtown in Motion” from New York City. “Midtown in Motion” allows city traffic engineers to identify and respond to traffic conditions in real time. This would reduce the amount of traffic jams that happen and would reduce the amount of time that vehicles spend idling in traffic which causes more greenhouse gas emissions to be produced by vehicles.

#### **3.2.3 “10 ways to envision a smart city”**

This article tells us that smart cities deal head-on with thorny modern problems such as transportation, energy efficiency, education, public safety, public health, cyber security, and many more. An idea from this article which I think could be implemented in Singapore would be solar-powered smart trash bins that signal when the bins are getting full. This would help Singapore save millions of dollars every year by reducing the amount of manpower needed to manually collect the trash everyday. Instead, the workers can now collect the trash when the bins are full which would make it more efficient than collecting the trash when the bin is only half full.

### **3.2.4 “Energy Efficiency: The Clean Facts”**

According to the article, widespread use of efficient appliances, electronics, equipment and lighting, along with better insulation and other weatherization, could cut 550 million metric tons of carbon pollution a year by 2050 in the US. It is also stated that energy efficient appliances can also help an American household save up to \$500 on utility bills per year. However, they do not state how efficient the appliances must be to be able to achieve that amount of savings per year. Whereas in Singapore, there is a scheme called “The Energy Label” to help consumers make informed decisions when buying household appliances. The ratings are 1 tick for low energy efficiency to 5 ticks, which stands for excellent energy efficiency. I think that this is one area that Singapore is doing better than the US to help consumers go green instead of just telling the citizens the amount they can save assuming that they did their research before buying appliances.

### **3.2.5 “Singapore - CO2 emissions”**

According to this website, Singapore’s carbon dioxide emissions had approximately decreased by 1.67% from 2013 to 2018. This is far cry from Japan’s 12% decrease in the same time frame. Singapore could improve on this by adopting technologies from Japan such as ultra-lightweight solar panels by using a thin film made from perovskite, developed by the Global Zero Emission Research Center. These solar panels boast vastly better conversion efficiency than conventional cells, allowing for more power

generation in a smaller space. Although Singapore has installed solar panels in Tengah Reservoir, I feel like they can still be improved by using the new solar panels made from perovskite. This is because these solar cells made from perovskite can reach a peak efficiency of 29.1% with a theoretical limit of 43% compared to the peak efficiency of 25.6% and a commercial efficiency of only 18% of traditional silicon panels. (Peak efficiency refers to the portion of energy in the form of sunlight that can be converted via photovoltaics into electricity by the solar cell.)

## **4. METHODOLOGY**

### **4.1 Needs Analysis**

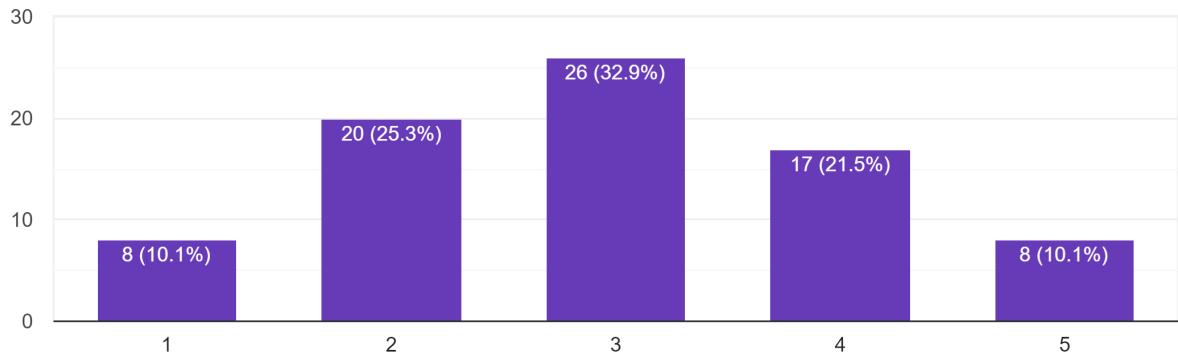
A needs analysis was conducted to assess how relevant our project was to teenagers from Primary 6 to Secondary 2. The objective of this analysis was to firstly find out the teenagers' knowledge on going green. Secondly, how interested they are in learning the advantages of a smart and green city. Lastly, to test their general knowledge on how much they know about the various ways to go green.

### **4.2 Survey Results**

The survey results below show us that not all teenagers are confident about their knowledge about a smart city and the various ways to go green. Based on the mini quiz we conducted in the survey, we can conclude that the teenagers are unsure of the smart methods they can utilise to go green.

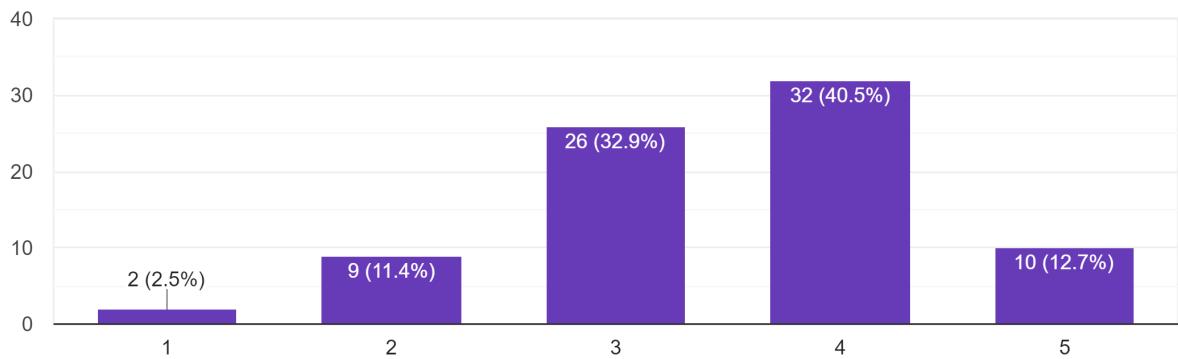
On a scale of 1-5, how much do you know about smart city?

79 responses



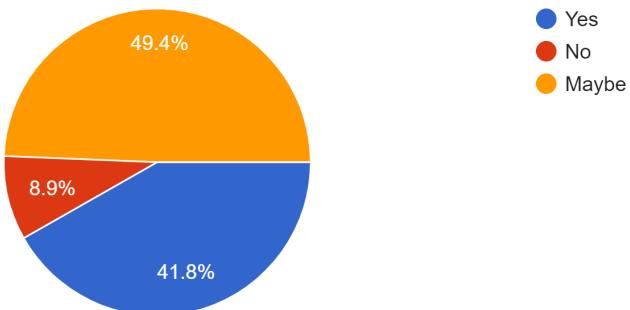
On a scale of 1-5, how much do you know about going green?

79 responses



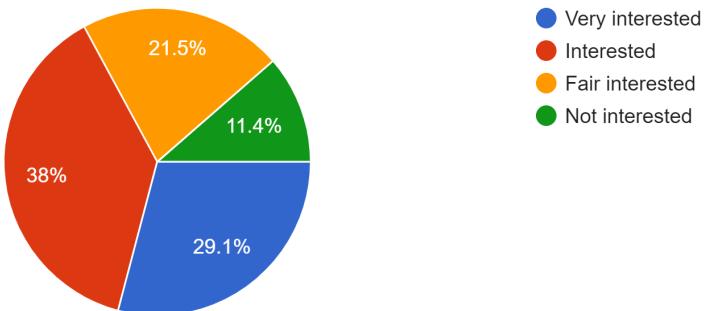
Do you think Singapore is a smart city?

79 responses



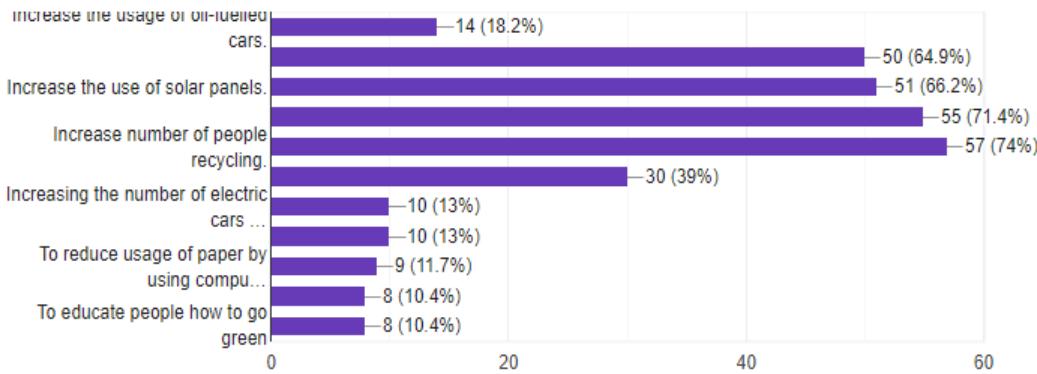
Are you interested in learning about the advantages of a smart and green city?

79 responses



Which of the following methods do you think are smart ways to go green? (You may choose more than one)

77 responses



### 4.3 Development of Resources

We conducted a literature analysis on four different articles from reliable sources to gather information on our topic and wrote an overview on each article and a conclusion based on the information given. By developing a website and other products such as two animations, a social media page, crossword puzzle and a quiz, we have made it easier, more lighthearted, and enjoyable for the teens to process and understand the information.

### 4.4 Pilot Test

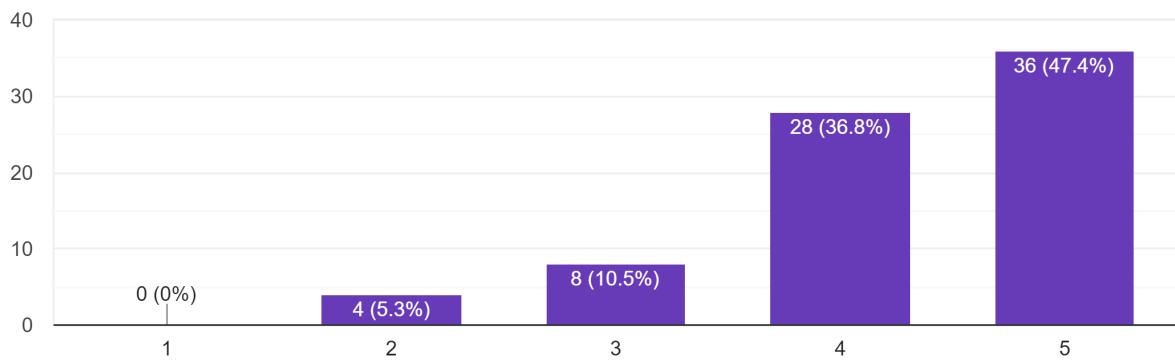
We have surveyed the users of our website to see how useful our website was for them and how much they have enjoyed the resources on our website.

According to the 76 responses we collected from our survey, we can proudly say that most of the teenagers are satisfied with our website and the materials and information on the website. Over 80% of the teenagers gave a score of 4 or 5 out of 5 on the usefulness and the presentation of the information on our website, and we are quite

satisfied with that. However, we feel that we can improve on making the information on our website more easier to understand, as a slightly higher percentage of people, 17.1%, gave a score of only 3 out of 5 for it. We would accept the suggestions of the teenagers, and adopt them such that we can improve on our website.

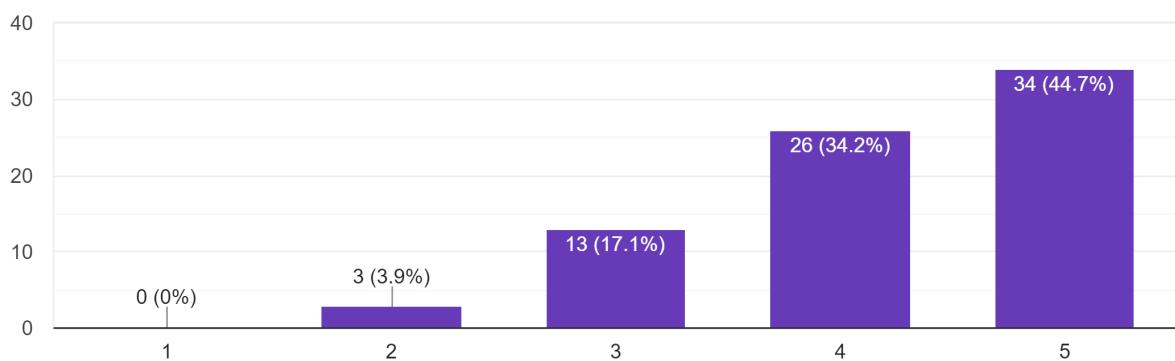
How useful is our website?

76 responses



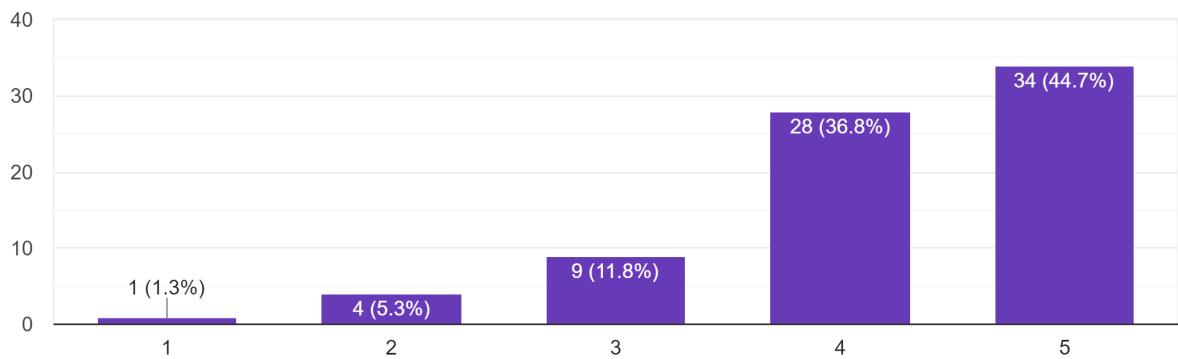
Are the information on the website easy to understand?

76 responses



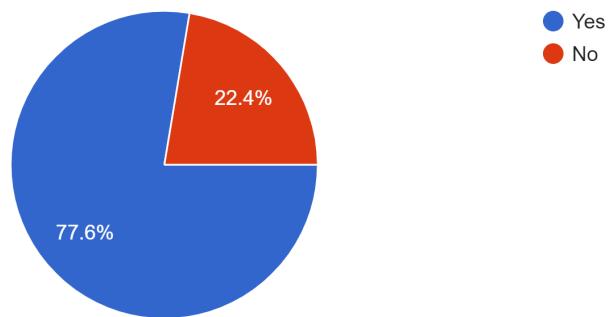
How is the presentation of information on our website?

76 responses



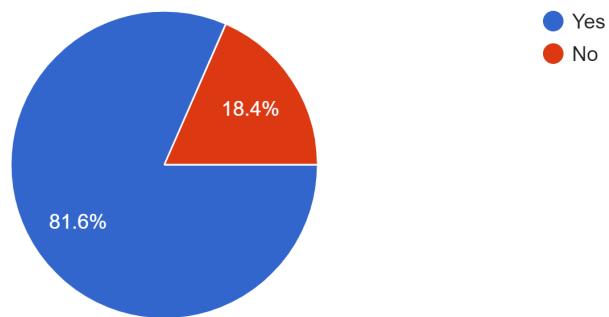
Are the games and videos on the website fun and interactive?

76 responses



Do the games and videos make it easier to learn and digest the information?

76 responses



How else can we improve our website?

76 responses

- Information can be presented clearer to convey to the readers better
- Games and quizzes can be modified to be more useful for your target audience
- Info in Further readings can be presented clearer. A bit too lengthy
- Information can be portrayed in more layman's term to allow readers to understand better
- Make the videos more interesting. I know some of the tips/info there already.

## 5. OUTCOME & DISCUSSION

After we finished pilot testing, we received many comments, which were mostly positive. However, we have also decided to listen to the negative feedback provided and make changes to our resources based on the feedback to make the learning experience more enjoyable. Based on the feedback, we have added more information on parts like the tips on how to go green and smart. We also edited information on the website to make it less lengthy and easier to digest. Furthermore, we changed the games a little to make it not as confusing as before and lesser glitches. The limitation we face is the age groups. Further work can be done by having an interactive element suiting each age differently. This is because teenagers at 16 might not like doing things teenagers at 14 do. Teenagers at 14 might like things like quiz and crossword but teenagers at 16 might only like the Instagram account and we did not cater much to them. So, further work that can be done on our project is to have a wide variety of interactive elements that suit each individual age.

## 6. CONCLUSION

In conclusion, the project has allowed not only us but many other teens to understand a lot more about tips and benefits to go green and smart. Our research on the Singapore Green Plan 2030 also enlightened us how Singapore is also trying their best to make Singapore a greener city. During the proposal evaluation, the judges' suggestions on including the Singapore Green Corridor as part of our project also helped with the idea of not just learning on going green and smart but actually, going into the greens itself as it is also part of one of main objectives of the SGP. This project has also helped us to develop a lot of knowledge and useful skills about resource development, for example, the making of our videos, website, quiz and crossword. The process of designing and producing things like our videos will undoubtedly be useful in the future projects as it will be a much smoother and easier process for us because of this experience. We have also listened to comments made on our project which were both positive and negative and made changes to our project accordingly. Even though there were many challenges we encountered during the span of our project, one of which was to find a common time in which we were all able to meet up and work on the project, especially due to the current Covid-19 measures. Another being the lack of experience we had on creating a website together and making our Instagram posts. This taught us to work as a team better to have greater efficiency. Another challenge was summarising the information on the websites into a literature review , and we could not have done it without one another and our mentor's help. Although the members of the project all have diverse views, we listened to each other's opinions and used each other's opinions to build on whatever we had done. We accept each other's views and eventually reach a consensus.

## 7. REFERENCES

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