



IT204F Project Proposal

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QNA Session

The background is a stylized illustration of an ocean scene. The sky is a light blue with two white, fluffy clouds. The water is depicted in two shades of blue, with darker blue waves in the foreground. In the foreground, there is a white surgical mask floating on the surface. Further back, a white plastic bottle is visible. A small, dark blue fish is swimming near the mask. On the right side, a white glove is floating on the surface. The overall theme is environmental pollution and its impact on marine life.

1

Background

Background

- Over 300 tonnes of plastic have been produced yearly around the world.
- Singapore alone is responsible for around 900 million kilograms of plastic disposal.
- This figure will increase to 29 million tonnes should no action be taken.





- The National Environmental Agency (NEA) main purpose is to ensure a clean and sustainable environment for Singapore.

- NEA current policy is to monitor Singapore's water quality for any physical and chemical pollutants.

- The main method of clearing up pollutants is by using volunteers to pick them up once they are washed onto shore.



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Resulting Problem

Resulting problem : Causes

Common Causes of Plastic Pollution

Main causes for ocean plastic pollution:

- Littering
- illegal dumping
 - Plastic along coastlines gets hauled by the tides from littering

Other causes:

- Urban and Stormwater runoff
- Sewer overflows



Image sources: <https://www.chesapeakebay.net/issues/threats-to-the-bay/stormwater-runoff>
<https://timesofindia.indiatimes.com/citizen-reporter/stories/sewer-overflows-on-main-road/crshow/58903106.cms>
<https://opelikaobserver.com/litter-an-ever-growing-problem/>
<https://www.suchtv.pk/pakistan/sindh/item/66584-factory-owners-illegally-dumping-industrial-waste-in-karachi-face-legal-action.html>

Resulting problem : Causes

How does plastic usage leads to pollution in the ocean?

Other causes:

- Improper waste management
- Industrial operations
- Factors like intense weather and wind can lead **plastic pollution** into oceans.
 - Follows the current of water, ending up in oceans.



Image source: <http://learn.e-limu.org/topic/view/?t=38&c=7>

Resulting problem : Effect on Marine Life

- **>100,000 of Marine Life caught in plastic every year**
 - Restricting food intake and movement
- **Colours and pattern of plastic waste resembles their prey.**
 - Turtles, Fish and Whales
- **Algae and Bacteria collected in plastic debris.**
 - Important source of protein and energy
- **Toxic compounds can be absorbed in plastic.**
 - Gives false feeling of being “full”
 - Penetrates internal organs
 - Prone to starvation, illness or death



Image source:

<https://newsinfo.inquirer.net/1095506/ph-marine-life-center-not-spared-from-plastic>

Resulting problem : Effect on Human Health

Problems caused by Plastic Pollution

- Cancer
- Heart problems
- Childhood Development issues
- Loss of important food source
- Reduction in oxygen production

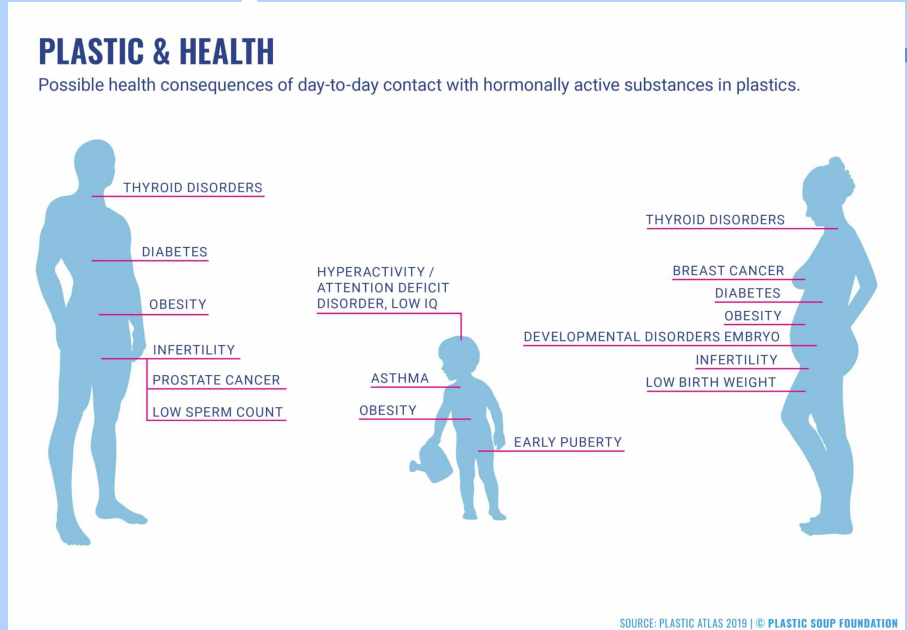


Image source:

https://www.plasticsoupfoundation.org/wp-content/uploads/2021/06/PSF210607_infographics9-1-2_048x1442.jpg

[What do people really know and want to know about plastic & health? - Plastic Soup Foundation](#)

Resulting problem : Effect on Tourism

Problems caused by Plastic Pollution

- **Pollutes tourist spots**
 - Less tourist visits
 - Decrease in revenue
- **Worsen Public Reputation**
 - Decrease in revenue
- **Increase in job layoffs**

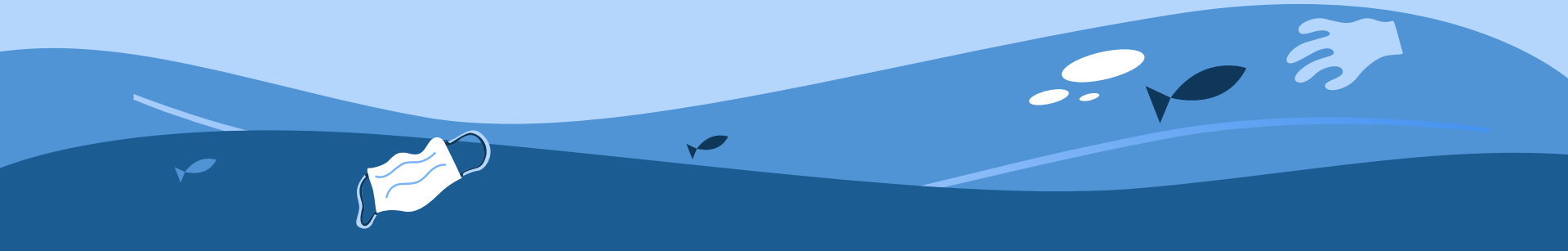


Image sources:

<https://www.loveexploring.com/gallerylist/86221/amazing-tourist-destinations-being-ruined-by-trash>



Solution



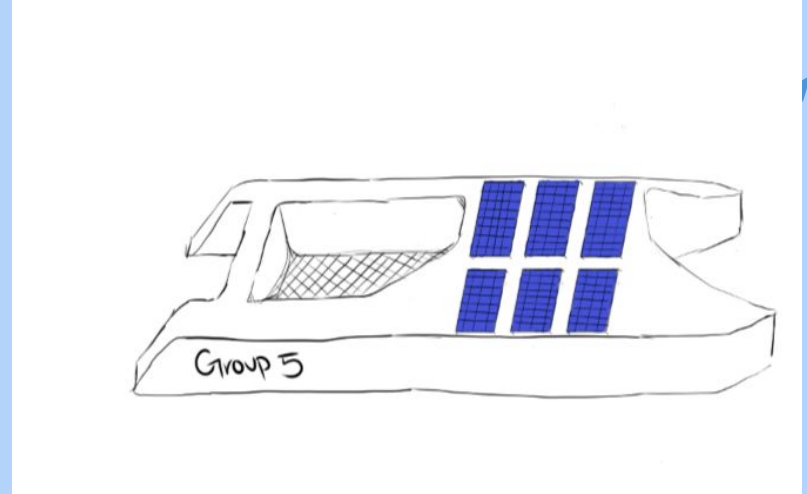
Solution

How does the unmanned miniature boat work?

- Collects floating rubbish along the coastline.
- Follows a predetermined path set by the National Environment Agency.
- Returns to docking station for disposal of trash.

What if something happens to the boat?

- A fail safe will be implemented to take remote control of the boat/Ocean Roomba.



Created and designed by: Yi Ting

Solution



How this benefits NEA

- Clear up shoreline more efficiently.
- Reduces ocean cleaning time, allowing priority for more important tasks.
- Gather data such as the type of plastic thrown



How Feasible is it

Very likely:

- Possible to code out the action and decision making process of the Roomba on scratch.
- Also allows for testing to be done on the robot's code through the visual elements on scratch.

-However:

Not feasible to immediately implement this due to financial limitations.



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Methodology

Methodology: Scratch

Why use Scratch software?

Easy to implement simple tasks.

- Does not require much knowledge of coding.
- Has a “drag and drop” interface for basic functionality.

Enables collaboration across device platforms.

- Makes it convenient for us to code anytime, anywhere.

Makes development process easier.

- Allows access to all resources under one location.

In turn, these aspects helps to reduce the delivery timing of the solution.



Image source:

<https://www.youtube.com/channel/UCjcQmKeifVUUH5s4E4OrMhg>

Methodology: Waterfall Approach

Why utilise Waterfall Approach?

Plan the project timeline ahead.

- Gives a clear direction of the project
- Sets reasonable target setting for the project

Gives structure to the overall project.

- Makes it stable when transitioning phases

Allows early detection of bugs.

- Rectify issues much faster

All in all, this reduces misunderstandings among team members.

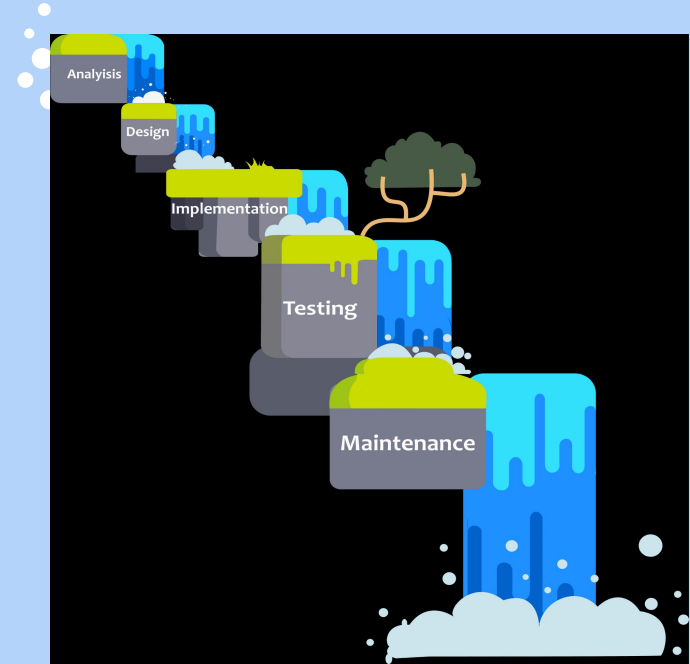


Image source: <https://codingzap.com/waterfall-model/>

Methodology: Information Gathering

What do we use to gather information?

We source our data and information from relevant websites such as National Environmental Agency using search engines.

Why do we gather information?

We could accurately design an effective solution to combat the plastic water pollution.

This may include...

- Functionality of the Robot
- Additional Features
- Improvements to the solution



Image source:

<https://www.vecteezy.com/vector-art/436840-vector-web-icon>



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References

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3. **Plastics in the Ocean Affecting Human Health.** (n.d.). Case Studies. https://serc.carleton.edu/NAGTWorkshops/health/case_studies/plastics.html
4. **The Economic Impacts of Marine Debris on Tourism-Dependent Communities | OR&R's Marine Debris Program.** (n.d.). <https://marinedebris.noaa.gov/research/economic-impacts-marine-debris-tourism-dependent-communities>
5. **Witch, W.** (2022, February 15). *Why the travel and tourism industry need to combat plastic pollution.* Water Witch. <https://waterwitch.com/combating-plastic-pollution-in-the-ocean-sea-cleaner/>
6. **A., A.** (2019, November 22). *Why is marine life so important? – MassInitiative.* <https://massinitiative.org/why-is-marine-life-so-important/>
7. **WWF Singapore.** (2022, April 4). *Towards a plastic-lite Singapore.* <https://www.wwf.sg/plastics/>

**Thank you for
listening!**



A stylized illustration of an underwater scene. In the background, the profile of a person's head is visible, facing left. The interior of the head is light blue, while the exterior is dark blue. Various icons are scattered throughout: a blue surgical mask floats near the top right; a small blue fish swims near the top left; a yellow and blue thermometer is on the left; white bubbles of different sizes are on both sides; a blue hand is at the bottom left; a blue foot is at the bottom right; and a blue plant-like structure is on the bottom left. In the center, a dark blue pentagon contains the white number 6.

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QNA Session