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Introduction

Waste management has always been a challenge for Singapore. With limited space, we made a switch from conventional in-ground landfills to waste incineration and incineration ash burial on our offshore landfill, Pulau Semakau, in April 1999. The Semakau Landfill was initially estimated to last till 2045, but that date has since been moved forward to 2035.

The increasing amount of waste we generate forces Singapore to find suitable locations for more waste disposal facilities, which will not be sustainable as we will eventually run out of space. Therefore, it is crucial for us to collectively reduce the amount of waste we generate, which includes reducing our consumption of all types of disposables.

On 26 September 2020, 55 Citizens with a shared concern for the environment gathered for the first time, online. This was the beginning of their four-month journey as part of the Citizens' Workgroup on Reducing Excessive Consumption of Disposables, with the aim of creating ideas to build a sustainable future for Singapore.

After undergoing informative sessions on the background of the problem, the existing efforts made and hearing from stakeholders, participants worked together to brainstorm causes and factors contributing to the problem.

From the sessions, participants found that public awareness on the issue of disposables was lacking. In cases where there was awareness, there was little impetus for corrective action on a personal level. The limited data available on the issue of disposables was not compelling enough to incite change, partially because such information was often presented in ways that were hard to relate to.

Due to the effectiveness of waste incineration as a solid waste management strategy, citizens struggle to internalise the impact of waste generation, including that arising from the consumption of disposables. While Singaporeans may be aware of increasing pollution, microplastics accumulating in the ocean or that Semakau Landfill is filling up, simple actions that can reduce waste may not come naturally to everyone.

Though national goals may be set, such as to cut waste sent to landfill per capita per day by 30% by 2030, these goals are also hard to visualise and citizens may not know how impactful their personal actions may be towards reaching these national goals.

In addition, to imbue sustainable actions in daily life, it boils down to breaking old habits and forming new ones, through repeating certain actions. It is best to educate and form sustainable habits from young.

This resource pack thus aims to equip teachers with relevant information on the topic of Reducing Consumption of Disposables. Teachers will learn various tips on how to create more awareness on the urgent need to reduce consumption of disposables as well as a series of suggested engagement activities to educate and instil sustainable habits in the students (primary and secondary level) in a simple manner.

Section 1: What Are Disposables?

Defining Disposables

Disposables refer to products or packaging that are designed for single use.

Examples of disposables include the following, but not limited to -

1. Medical hygiene products
    a. Disposable face masks
    b. Sterile syringes
    c. One-time use personal protective equipment (PPE)
    d. Nitrile gloves
2. Food and beverage takeaway or delivery ware
    a. Disposable forks, spoons and chopsticks
    b. Disposable cups
    c. Aluminium trays or wrappers
    d. Disposable tablecloths
    e. Disposable takeaway boxes
3. Disposable bags to provide convenient means for shoppers to carry purchases and to bag waste for disposal
    a. Shopping bags
    b. Trash bags

Disposables can be made of various types of materials. Some common materials include -

1) Plastic
    a) Commodity plastics
        i) Polyethylene
            (1) Low-density polyethylene (LDPE)
            (2) Linear low-density polyethylene (LLDPE)
            (3) High-density polyethylene (HDPE)
        ii) Polyethylene terephthalate (PET/PETE)
        iii) Polypropylene
        iv) Polyvinyl chloride (PVC)
        v) Polystyrene (e.g., Styrofoam)
        vi) Poly(methyl methacrylate) (i.e. acrylic)
    b) Bioplastics
        i) Polylactic acid
        ii) Cellophane
        iii) Starch-based plastics
2) Paper
    a) Cardboard
    b) Wax paper
    c) Plastic-coated paper
3) Aluminium

Understanding Disposables

Disposable items are convenient and low-cost. Many of these items were introduced for specific reasons. Disposable plastic utensils, for example, became popular in the 1960s. They were used at home and in restaurants to cut labour costs and the energy required to clean traditional silverware. They also cut down on the spread of diseases.

In the late 1970s and early 1980s, plastic bags were introduced to address concerns about how many trees were being cut down in order to produce paper bags, which were more common at the time.

Disposable products such as surgical masks used during Covid-19 are crucial in the medical industry to help prevent the spread of infection. Furthermore, disposable plastic products have been helpful in limiting food waste as they are used to maintain the freshness of food and liquids and prevent contamination.

Section 2: Why Does Reducing Disposables Matter?

Environmental Impact of Disposables

The common materials used for disposables are plastic and paper/cardboard. Biodegradable plastics are also becoming more commonly used. Producing them consumes resources.

Plastics require the use of crude oil, which is a non-renewable resource. Its extraction alone is a resource-intensive process, requiring a large amount of energy and water while inevitably producing toxic gases. Processing the crude oil itself into usable plastics is another resource-intensive process, and the distribution of such products across the supply chain also requires energy. Meanwhile, disposables made from paper/cardboard or biodegradable plastics can incur environmental impacts such as deforestation and water consumption. Typically made of wheat or corn, raw materials used for biodegradable plastics are land- and water-intensive crops.

All types of disposables, regardless of their material type, have an impact on the environment during their production, transportation, and disposal. The use of disposables also contributes to the generation of waste. Disposables are not designed to be reused, and because of their makeup, some cannot be recycled and have to be disposed of.

Waste Situation in Singapore

According to the National Environment Agency, in 2020, 5.88 million tonnes of solid waste was generated. Almost 3 million tonnes of this waste made its way to be incinerated and sent to Semakau landfill, hovering around the same amount as previous years

To give a scale of how significant disposables are amongst the waste disposed, about 200,000 tonnes of domestic waste disposed of annually in 2020 and 2019 were disposables, comprising items such as disposable carrier bags, food packaging tableware, and utensils. These were enough to fill up about 400 Olympic-size swimming pools.

During the two-month circuit breaker against COVID-19 in 2020, there was an increased demand for takeaways and meal delivery. A study by the National University of Singapore estimated that this increased demand alone led to Singaporean households generating an extra 1,334 tonnes of plastic waste solely from food containers alone, which is equivalent to the weight of 92 double-decker buses. This increase in demand stemmed from heightened hygiene awareness and requirements, and the stoppage of dine-in during Circuit Breaker. As disposable masks, PPE and other forms of disposables such as e-commerce packaging were not accounted for, the true volume of disposables generated is underestimated.

The current “take, make, use and throw” approach to disposables is not sustainable. This approach has contributed to carbon emissions while the ash generated from the incineration of such items ends up at **Semakau Landfill, which is expected to be full by 2035**.

Local Waste Management and Minimisation Efforts

Local waste management has dedicated infrastructure and differentiated flows for the various categories of waste collected. This system begins with **waste collection**, which starts at homes and businesses. Once waste is collected, they are either sent for **recycling**, **incineration** or **offshore disposal**.

In **recycling**, recyclables are either sent to various Materials Recovery Facilities (MRFs) around the island or to Sarimbun Recycling Park. At the MRF, recyclables are sorted by material type (e.g. plastic, paper, glass and metals) before being sent for recycling. For example, paper-based recyclables are shredded and soaked into pulp, which is used to make new reams of paper. In **incineration**, the waste is sent to waste-to-energy (WTE) facilities, such as Tuas South Incineration Plant or the Senoko Waste-to-Energy Plant. Waste is incinerated to both generate energy and to conserve landfill space. Incineration emissions are controlled and filtered to minimise environmental impact, while the incineration ash from burning is disposed of in Semakau Landfill. In **offshore disposal**, the incineration ash and non-incinerable waste is sent to Semakau Landfill, an offshore landfill, where it is unloaded into dedicated plots and covered with earth, allowing the surrounding greenery to grow on it.

Plastic disposables as well as paper-based disposables that are lined with plastic are detrimental to the environment when dumped into it. In Singapore, we are fortunate that our comprehensive and integrated solid waste management and collection system ensures that our disposables that are not recycled are properly collected and incinerated at our waste-to-energy plants. They are not directly landfilled, unlike in some other countries. Because of this, and stringent measures against pollution and littering, disposables do not cause Singapore the same problems faced by some other countries, such as the risk of leakage into the environment as land-based or marine litter. **For the same reason, the environmental benefits of biodegradable disposables do not apply in Singapore.**

The 3Rs approach – “Reduce, Reuse, Recycle” – is a hierarchy, wherein Reducing is the first and most important step, followed by Reusing. However, consumers often focus on recycling. Yet, recycling disposables is not necessarily a panacea to address such waste. Disposables used for food and drinks cannot be recycled as they are often contaminated. Furthermore, an item can only be eventually recycled if there is a recycling facility that can accept it and recycle it in a cost-effective manner. The export market for recyclables varies with global prices and currently faces challenges such as lack of demand for recycled plastics, which is exacerbated by falling oil prices. Besides the economic considerations, restrictions imposed by countries on cross-border movements of recyclables further compound the problem and add more obstacles to recycling. We are therefore unable to rely solely on recycling to reduce disposables in waste. Neither does recycling address the unsustainable use of resources and emission of greenhouse gases.

Clearly, we should focus on reducing disposables consumption as much as possible and reusing items to extend their lifetime. Given that alternatives to disposables, such as reusable bags and take-out containers, are readily available, it is important to move away from this linear model of consumption and reshape behaviours towards the use of reusables over

disposables. The concerted effort of the public, businesses, and non-governmental groups is key to successfully reducing the consumption of disposables.

Section 3: What Has Been Done So Far?

Environmental efforts and green policies have had a longstanding history in Singapore, which first started with the 'Garden City' vision in 1967. In 2015, Singapore published the Sustainable Singapore Blueprint (SSB), in which one of the goals was to minimise waste production and enhance local recycling efforts.

2019 marked an important milestone for Singapore as it was designated the Year Towards Zero Waste and a Zero Waste Masterplan was rolled out to chart the key strategies Singapore would adopt to build a sustainable, resource-efficient and climate resilient nation. National goals were set for Singapore to move toward a Zero Waste Nation, such as to cut waste sent to landfill per capita per day by 30% by 2030 and achieve a 70% overall recycling rate, in order to extend the lifespan of Semakau Landfill. The government, companies, and groups have continued to play an instrumental role in working towards these goals.

In light of growing environmental advocacy and support for green initiatives, various NGOs and grassroot collectives have started projects working towards the 3Rs or zero-waste objective. For example, ZeroWaste SG partnered with over 1000 businesses and institutions in their Bring-Your-Own (BYO) campaign to reduce the consumption of disposables. Partners gave consumers incentives to bring their own containers or bags when buying or consuming goods and services. Their campaign reduced over 2.5 million plastic disposables in four months. Another NGO, Plastic-Lite Singapore, runs Bounce Bags, a bag-sharing initiative that loans reusable bags to shoppers for use from designated bag-sharing points. Shoppers return the bags after use or can even donate extra bags to these bag-sharing points.

NEA runs the nationwide "Say YES to Waste Less" campaign to drive public awareness of the impact of excessive consumption of disposables and the need for action. Retailers, F&B outlets, supermarkets, hotels, grassroots organisations, schools, and NGOs partner NEA in this effort. Their actions include prompting customers to opt out of disposable cutlery for their online orders and providing reminders and incentives to customers who bring their reusables. NEA will also roll out a disposable carrier bag charge at supermarkets in mid-2023 to further encourage people to bring their own bags and reduce the use of disposable carrier bags. To raise companies' awareness of the amount of packaging they used, companies will need to collect data on the packaging they supply and develop plans to reduce, reuse, and recycle these, and submit these to NEA, under the Mandatory Packaging Reporting (MPR) framework. The MPR lays the foundation for an Extended Producer Responsibility framework for packaging waste management, where companies will be responsible for collecting and treating their packaging waste, which would in turn incentivise them to reduce the packaging they use.

Hawker centres have started to move toward using reusable utensils for eating in, such as in new hawker centres. To reduce the use of bottled water, water dispensers have been installed in most hawker centres, sport centres, and some bus and MRT stations.

Singapore's public sector is also taking action to move towards using less disposables under GreenGov.SG.[1] F&B outlets at public sector buildings will not use disposables for dine-in. This will apply to new tenancy agreements signed from 2022 onwards. Public agencies will also not provide bottled water for meetings organised within public sector premises.

Regional and International Efforts

"Single-use" was the Word of the Year published by Collins Dictionary in 2018. Reflecting increasing awareness of plastics' impact on the environment, "single-use" has been used by environmentalists and climate advocates around the world to advocate measures to combat single-use, especially plastics, pollution.

In March 2019, environmental ministers from all over the world issued a Ministerial Declaration at the 4th Session of the United Nations Environment Assembly (UNEA-4) committing to "significantly reduce single-use plastics (SUPs) by 2030". This global pact to combat disposables is supported by the adoption of restrictions on single-use plastics/disposables in many countries. This includes the European Union (EU)'s Single-Use Plastics Directive in 2019, under which measures to reduce consumption of certain SUPs and ban the use of others, design requirements for more environmentally friendly products, and waste management and clean-up obligations for companies, were introduced. Over 157 countries or jurisdictions have implemented restrictions such as bans or charges on disposable or single-use plastic bags. Closer to home, the Association of South East Asian Nations (ASEAN) has committed to various pacts and agreements to combat plastic waste and pollution, such as the Regional Action Plan for Combating Marine Debris in May 2021, which includes actions to build capacity for waste management, provide guidelines on reducing and managing marine litter, and enhance knowledge and public awareness.

[1] All buildings, facilities and offices that are owned, occupied, and/or operated by the public sector are covered by the GreenGov.SG initiative. These include schools, offices, training institutes, sports recreation centres, libraries, and community centres.

Section 4: How to Reduce Disposables?

While it is not possible to completely eliminate our use of disposables, we can do our part to reduce our waste simply by consuming less and switching to reusables wherever possible. By consuming only what we need and reducing waste generation, we send less waste to the landfill, thus extending its lifespan. The table below shows some ways to reduce disposables and other waste in various settings.

Ways to Reduce Disposables & Other Waste in Various Settings	
At School	• Bring your own bottle to the canteen for drinks • Avoid using disposable straws • Reuse materials like scrap paper, toilet rolls and bottle caps etc. for arts and craft • Use both sides of writing papers • Use refillable stationery like mechanical pencils • Share your presentation materials electronically
When Outside	• Bring your own reusable lunchbox and utensils when packing food to take away • Say no to disposable carrier bags; bring your own bag instead • Plan your shopping to avoid over-buying • Shop for groceries at packaging-free stores (e.g. those with bulk bins which encourage the use of your own containers/jars to purchase unpacked items such as cereals, coffee or laundry detergent) and bring your own containers to pack the items you purchase • Avoid using disposable straws, utensils and single-serve packets when eating out
At Home	• Reuse containers and carrier bags • Opt for electronic newsletters and mailers • Buy fresh produce and make your own meals instead of consuming pre-packaged foods • Avoid disposable self-care essentials and use refillable products • Avoid disposable kitchen towels or disposable wet wipes; use reusable cloths/rags instead • Practise recycling

Section 5: Suggested Activities

Creating Awareness

Generate awareness on the topic of reducing disposables with students by sharing educational videos or fun facts with them and engaging in follow-up discussions.

Suggested Discussion Activity:

1) Share this video with students:
   How can Singapore kick its plastic bag habit?
   https://youtu.be/id6r22OO0oY
2) Discussion questions with students:
   a) Why do you need disposable bags when you go grocery shopping?
   b) Without plastic bags, what other items can you use to bag rubbish and line the rubbish bins?
   c) Why is it important to use your own bags, and reuse them as much as possible?
   d) Do you bring your own bags to grocery stores?

A list of fun facts can be found in Section 5 of the presentation deck, while a list of educational videos can be found in Section 6 of the presentation deck or the table below.

Educational Videos	
For Section 2: Why Does It Matter?	1. In 2019 alone, we discarded 200,000 tonnes of disposables and the problem just keeps growing. If we continue like this, future generations will have to pay for our choices - **Say YES to WASTE Less** (Video length: 47 seconds) https://www.youtube.com/watch?v=fbmNXsbyUkE
	2. Semakau landfill's lifespan is getting shorter by the minute - **Save Semakau** (Video length: 1 min 25 seconds) https://www.youtube.com/watch?v=5o8MboWKaas
	3. **Singapore's Plastic Problem: Can We Curb Our Plastic Addiction?** (Video length: 48 min 3 seconds) https://www.youtube.com/watch?v=gbzm31Kjbxs
For Section 3: What Has Been Done So Far?	1. Singapore's waste management solutions and the future of the world's garbage dilemma – **How Singapore fixed its big trash problem** (Video length: 12 min 55 seconds) https://www.youtube.com/watch?v=r-q5V6LDxEY
	2. **Say YES to WASTE LESS Music Video** (Video length: 1 min 30 seconds) https://youtu.be/UjlT5GsxNno
For Section 4: How to Reduce Disposables?	1. Insights to Singapore's plastic bag habit - **How can Singapore kick its plastic bag habit** (Video length: 4 min 28 seconds) https://youtu.be/id6r22OO0oY
	2. **Nearly 3,000 premises pledge to reduce food waste, use of disposables** (Video length: 1 min 53 seconds) https://www.youtube.com/watch?v=Eoh4sXPKbAg

Web of Waste

Activity Type :	Group project and discussion
Age Group :	Primary and Secondary Level
Group Size :	3 - 4
Time Needed :	1 hour
Materials Required :	- Mahjong paper - Markers - Mobile Phones - Padlet
Learning Objectives :	- Identify common disposables in student's everyday lives - Categorising disposables by context of usage - Evaluate the dispensability of such disposables
Description :	1) Group students into small groups of 3 to 4 2) Students in their own groups are to list out disposables they encounter or use in everyday life. 3) Circle the disposables that are used in similar situations (e.g. dining out) together 4) Different groups can then place their mahjong papers together. Links can be drawn between groups of disposables that are related or similar in usage 5) Students can discuss the following questions afterwards a) Are such disposables necessary? b) How can we reduce our usage of such disposables?

The Great Collector

Activity Type :	Trigger/Discussion/Recap
Age Group :	Primary and Secondary
Group Size :	Individual
Time Needed :	1 week
Materials Required :	Not required
Learning Objectives :	- Become more mindful of the disposables that one uses across a day/week - Identify and categorise the types of disposables used on a daily basis
Description :	1) Students are to collect the disposables that they have used, and put them into a collecting bag instead of throwing it away a) For those that are used to contain food or are dirty in general, students can choose to wash it or tally the item on a piece of paper 2) After a day, or up to a week, students can come together and compare the amount and type of disposables that they have used over the period 3) Students can discuss the following questions afterwards a) Are such disposables necessary? b) How can we reduce our usage of such disposables?

Kahoot Quiz

Question *Correct answer highlighted in green*	**Follow Up Response**
1) Singapore has more than one active landfill. a) Yes b) No	Semakau Landfill is Singapore's only active landfill. It receives more than 2,000 tonnes of incineration ash from our waste-to-energy plants and non-incinerable waste daily.
2) Which of the following are NOT one of the main ways which Singapore manages waste? a) Incineration b) Offshore landfilling c) Recycling d) Composting/digestion	The three main ways which Singapore manages waste is through recycling, incineration, and disposing of it on Semakau Landfill. Other waste reclamation initiatives like composting or digestion are currently on a much smaller scale. For example, there is a pilot scheme where food waste is digested in hawker centers to produce water and energy.
3) Which of the following are considered disposables? a) Wooden chopsticks b) Aluminum foil container c) Plastic bag d) Biodegradable plate	Disposables are present in many settings, most of which are unexpected! A good test to see if a product is a disposable is to look at whether it has been designed and made to be reused many times.
4) Which of the following is NOT a reason why we should reduce our use of disposables? a) Making disposables can use a lot of energy b) Using disposables contributes to the amount of waste we generate c) Disposables make life convenient d) Disposables can pollute the environment	
5) The amount of waste produced per day in Singapore is equivalent to the weight of how many adult elephants? a) 10 b) 300 c) 800 d) 2,700	An adult elephant can weigh as heavy as 6 tonnes. In comparison, a staggering 16,110 tonnes of waste is generated in Singapore each day!
6) Which of the following products can be easily recycled? a) Paper coffee cups b) Styrofoam containers c) Glass jars d) Post-it notes	Paper coffee cups are lined with wax or plastic on the inside, making it hard to recycle as it must be separated from the paper. Styrofoam, like some plastics, cannot be recycled at low cost and used to make good products. Post-it notes have glue, which can affect the recycling process.
7) Are biodegradable materials a better alternative to reduce waste in Singapore? a) Yes b) No	Waste generated in Singapore is either recycled or incinerated. Unlike in many other countries, our waste is not landfilled directly. As such, the environmental benefits of using biodegradables do not

	apply in Singapore's context. Some biodegradables such as well oxo-degradable plastics could even interfere with the recycling process when mixed with conventional plastics. A more sustainable approach for Singapore is to reduce the use of all disposables and increase the recycling rate.
8) Which of the following can result in humans accidentally consuming plastic? a) Burning plastic waste b) Using disposables c) Microplastics in the sea d) Recycling the wrong type of plastic	Microplastics are formed when plastics are broken down into microscopic fragments over time. Typically, plastic trash found in the ocean break down into microplastics, which are ingested by fish. We then unknowingly eat these fish which are full of microplastics.
9) What is Singapore doing to reduce disposables usage? a) Bring-Your-Own campaigns b) Stop using disposables for dine-in c) Implementing a disposable carrier bag charge d) All of the above!	ZeroWasteSG pioneered the Bring-Your-Own (BYO) campaigns, where people are given rewards for bringing their own bags or containers when buying products. The Government requires all stall owners at newly-built hawker centres to not provide disposable dining ware for customers dining in. Disposable carrier bag charges are increasingly common in Singapore to deter people from using them unnecessarily, from FairPrice to UNIQLO. The National Environment Agency will also roll out a disposable carrier bag charge at supermarkets in mid-2023 to further encourage people to bring their own bags and reduce the use of disposable carrier bags.
10) How can you help to reduce disposables usage? a) Bring your own containers when packing food b) Decline a straw when buying drinks c) Bring your own bag when you go shopping d) All of the above!	

Green Projects and Field Trips

Schools can consider the following project ideas and locations for field trips:

1) Green Projects

- Sustainability challenge for students to employ knowledge gained from various subjects studied to solve a sustainability issue
- Environmental advocacy poster-making or video-making contests
- School fair to exhibit green projects and share green initiatives with other students Donation Drive e.g. collect old clothes to be donated/sent to recycling centres

2) Field Trips

- Beach or park clean-ups under the Keep Singapore Clean Movement [*registration via NEA website]
- Virtual trip to SembWaste Material Recovery Facility (i.e. recycling plants) [*available as part of the Clean & Green Singapore (CGS) Experiences]
- Virtual trip to TES Singapore to find out how precious metals in e-waste are being recovered [*available as part of the Clean & Green Singapore (CGS) Experiences]
- Waste-to-Energy Plant Visit [*currently suspended due to COVID-19]
- Visit to Semakau Landfill [*currently suspended due to COVID-19]

Section 6: Educational Materials and Information Sources

Video Links

- Save Semakau: https://www.youtube.com/watch?v=5o8MboWKaas
- Say YES to WASTE LESS: https://youtu.be/UjlT5GsxNno
- Explaining the Circular Economy and How Society Can Re-think Progress: https://www.youtube.com/watch?v=zCRKvDyyHmI
- How Singapore fixed its big trash problem: https://www.youtube.com/watch?v=r-g5V6LDxEY
- Singapore's Plastic Problem: Can We Curb Our Plastic Addiction?: https://www.youtube.com/watch?v=gbzm31Kjbxs

Printables

- https://www.nea.gov.sg/docs/default-source/our-services/a-guide-to-3r-practices-for-households.pdf
- https://www.towardszerowaste.gov.sg/waste-streams/packaging-waste/
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- https://www.cgs.gov.sg/what-we-do/towardszerowaste/sayyes/resourcespage/reducingdisposables
- https://www.cgs.gov.sg/what-we-do/keepsgclean/environmentandus/get-started/reducingdisposables

Section 7: Conclusion

Along with the rest of the world, Singapore experiences the effects of climate change. Reducing waste and adopting a “Circular Economy” approach will directly support our climate mitigation efforts. Towards this end, achieving “Zero Waste Nation” status is a key national priority for Singapore. Everyone has a role to play on our road towards becoming a Zero Waste Nation.

Schools play an important role in inculcating environmental values such as the importance of the 3Rs among the young

This resource pack aims to equip teachers and staff with the knowledge to educate students to become more involved in reducing excessive consumption of disposables along with practising the 3Rs. In turn, it is envisioned that they will bring this habit home and carry these environmentally conscious mindset and behaviour with them for life.

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- https://www.rappler.com/nation/house-approves-bill-banning-single-use-plastics
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1. Participants from the Citizens' Workgroup on Reducing Excessive Consumption of Disposables:
    a. Tan Yong Yi
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