

LOVE
YOUR **FOOD**
@ SCHOOLS
LET'S NOT BE WASTEFUL



Food Waste Reduction and Recycling Resource Kit

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INTRODUCTION

HOW MUCH FOOD WASTE DO WE GENERATE?

In 2018, Singapore generated 763 million kg of food waste. Food wastage happens when we buy, order or cook more than we can eat.



What's the big deal?

Singapore is a small country with limited space. At the current rate we are producing waste, **Semakau Landfill will be filled up by 2035 if we do not take steps to reduce waste.**¹ The resources and labour used to produce the food also go to waste, along with hard-earned money we use to buy food.



1 National Environment Agency
- <http://www.nea.gov.sg/energy-waste/waste-management/waste-statistics-and-overall-recycling>

LET'S NOT BE WASTEFUL

Together we can cultivate strong environmental ownership in schools and work towards a Zero Waste Nation.

This kit aims to help schools get started. You will find resources, including instructions on how to make game sets, to encourage students to reduce food waste.

FOOD MANAGEMENT CYCLE



MODULE 1: GROW FOOD



BACKGROUND

Growing food takes time, hard work and resources. Wasting food means we are wasting these resources!



THINGS YOU CAN DO

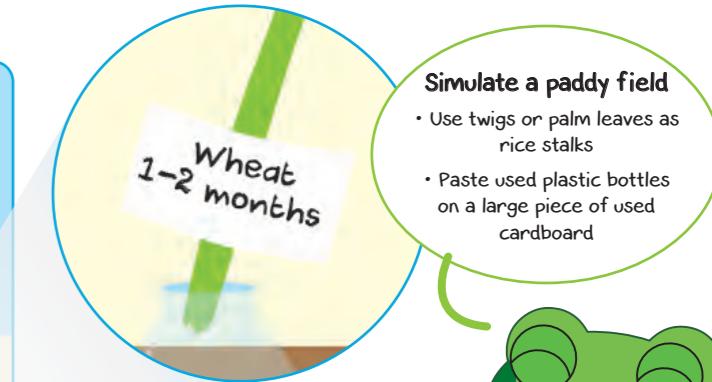
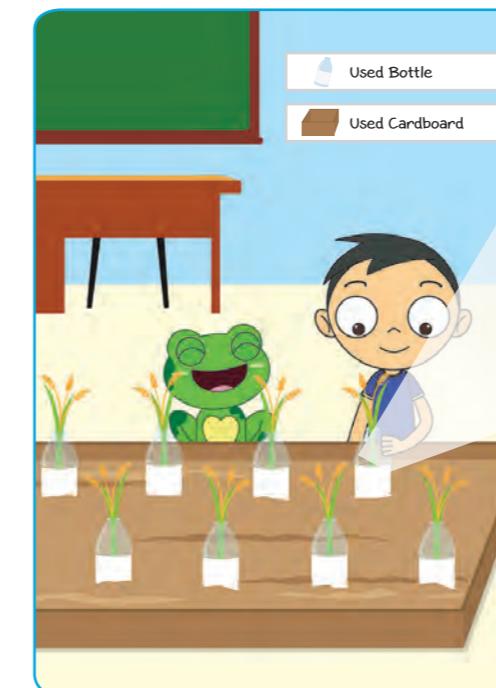
Activity 1: Growing food takes time, hard work and resources

⌚ **Objective:** To help students appreciate the time, resources and hard work required to grow food.

🕒 **Duration:** 20 minutes

❓ **What you need:**

- Activity sheet (found on page 6).
- 1 “paddy field” and 8 “rice stalks” with answers on the bottom of each stalk. When stalks are inserted into the field, answers should not be visible.



ACTIVITY ANSWERS:

Bananas - 10 months, Watermelon - 70-90 days, Wheat - 1-2 months, Maize (Corn) - 11 months, Rice - 110-130 days, Bok Choy - 60-95 days, Asparagus - 3 years, Soy beans - 100-150 days

Activity instructions:

- Step 1:** Distribute the activity sheet.
- Step 2:** Assign the students the role of “farmers” and ask them to search for the answers by picking the “rice stalks”. Set a time limit (e.g. 3-5 minutes) to provide sufficient challenge for students.
- Step 3:** Discuss the questions with students.
 - What resources do you need to grow food?
 - Do you feel that growing food requires a lot of hard work?

Activity 2: Farming in Singapore

 **Objective:** To give students first-hand experiences that help them understand the importance of cherishing food so they will appreciate and not waste it.

Organise a learning journey to a local farm or community garden (www.kranjicountryside.com and www.nparks.gov.sg).



CASE STUDY

Urban Farming at Spectra Secondary School

- ‘Urban farmers’ of Spectra Secondary School worked hard to grow vegetables during its 10-week Garden Based Service Learning (GBSL) curriculum.
- The harvested vegetables were sold to the public at Farmers’ Markets, with proceeds benefitting needy students. This project helped students understand and appreciate the hard work required to produce food.



Both growing and selling food requires so much patience and hard work! Experiencing the whole process taught me how hard the farmers have to work so that there is food for us to eat.

- Ashwina D/O Mani Sangar, student



Challenges to the project:

- **Weather.** In the event of bad weather, outdoor activities were affected.
- **Students’ involvement.** Students were reluctant to get their hands dirty.
- **Insect infestation.** Insects would feed on and cause damage to the crops.



Tips:

- **Be flexible.** Outdoor activities can be swapped with indoor activities, such as making compost or crafting a self-watering pot.
- **Install good infrastructure.** Infrastructure such as auto-irrigation systems, good drainage, trellises and netting frames can reduce the impact of downpours and deter pests.



Student harvesting baby bok choy after 35 days.



Parent volunteer harvesting Chinese Cabbage with his daughter.



Happy customer with her purchase.

- **Cultivate ownership.** Encourage students to propose ideas such as the types of vegetables to plant.
- **Involve parents/families.** This will help spread the message of cherishing food at home and tap on their expertise.
- **Plan ahead.** Time harvesting periods to coincide with school activities.



ACTIVITY SHEET: GROWING FOOD IS HARD

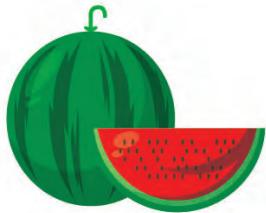


GROW FOOD

Growing food takes time, hard work and resources

Do you know how long it takes to grow these crops before they can be harvested?

Find out and fill in the blanks with the correct answers.



Watermelon



Rice



Wheat



Bok Choy



Soybeans



Asparagus



Bananas



Maize (Corn)

Other resources such as fuel and manpower are used to transport food to Singapore from countries as far as Brazil.

It takes weeks, months or even years to grow food and get it to your table, but it takes just seconds to waste it. Wasting food causes unnecessary strain on our environment.



MODULE 2: BUY AND STORE FOOD PROPERLY



BACKGROUND

Buy what you need and store it properly. Avoid buying items that you do not have plans for so they do not end up in the trash. Good storage practices protect food from contamination and extend its shelf life after purchase.



THINGS YOU CAN DO

Activity 1: Store it right

🎯 **Objective:** To teach students how to store food items properly after buying them, so that food items do not spoil easily.

⌚ **Duration:** 20 minutes

❓ **What you need:**

- Game sets comprising a “refrigerator”, “freezer”, “cupboard”, and “food props” per set (printables found on pages 9-11).

Activity instructions:

📖 **Step 1:** • Group students in teams of 5
• Distribute 1 game set to each group
• Get students to decide where to store the food items (10 minutes)

Step 2: Discuss the questions with students.

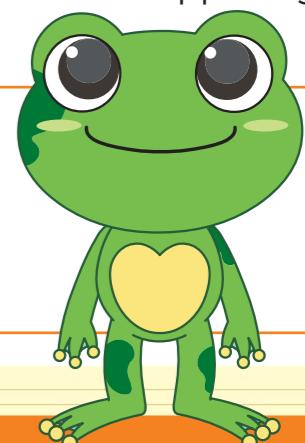
- Why should we only buy just enough food while grocery shopping?
- Why do we end up overbuying while grocery shopping? What are some ways to prevent this from happening?

ACTIVITY ANSWERS:

Freezer: Chicken, Fresh Fish, Frozen Nuggets, Prawns

Refrigerator: Apple, Bananas, Cabbage, Carrot, Cheese, Chocolate, Leafy Vegetables

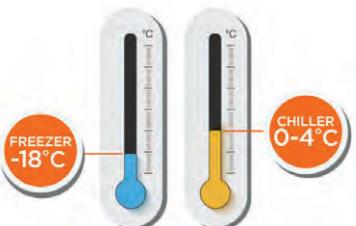
Cupboard: Can of Beans, Noodles, Potato, Potato Chips



Here are some additional storage tips to share with the class after the discussion:



- **Store it correctly.** Follow the instructions on the product's packaging. Some items must be kept in the fridge after opening.



- **Check your refrigerator.** The main compartment operates best between 0°C and 4°C, and the freezer at -18°C and below.



- **Store better.** Chips, crackers and cereals last the longest when kept in airtight containers. Airtight bag clips can also be a convenient option.



- **Practise “first to expire, first out”.** Place products that are nearing expiry at the front of the fridge, freezer or cupboard. This reminds you to use them as soon as possible.



- **Use the freezer.** Box up leftovers in serving portions and freeze them so that they last longer and can be reheated easily for the next meal.

Activity 2: Store it right

➲ **Objective:** Check the refrigerator at home and share how the food are stored. Students can do this with parents using the materials provided on pages 9 - 11.



PRINTABLES: STORE IT RIGHT

Food Props

Print on **A4 paper**, paste on recycled cardboard and cut along the lines.

FRESH FISH	CHEESE	POTATO
BANANAS	NOODLES	CARROT
APPLE	POTATO CHIPS	FROZEN NUGGETS
PRAWN	CABBAGE	CAN OF BEANS
CHICKEN	CHOCOLATE	LEAFY VEGETABLES



PRINTABLES: STORE IT RIGHT

Refrigerator and Freezer

Print on **A3 paper**, paste on recycled cardboard and cut along the lines.



PRINTABLES: STORE IT RIGHT

Cupboard

Print on **A3 paper**, paste on recycled cardboard and cut along the lines.





MODULE 3: ORDER FOOD

★ BACKGROUND

Order/take only what you can finish. Ask for a smaller portion and think twice before ordering a jumbo-sized meal.

THINGS YOU CAN DO

Activity 1: At a buffet

🎯 **Objective:** Simulate a buffet and remind students to order/take only what they can finish.

⌚ **Duration:** 20 minutes

❓ What you need:

- Food props in the ratio of 6 food props to 1 student (printables found on page 13).
- Food trays/containers to hold different food props.
- 1 plate and 1 resealable bag approximately 18 cm by 20 cm for each student.



Activity instructions:

Step 1: Place food items in food trays/containers to simulate a buffet set-up.

Step 2: Give each student one resealable bag and instruct them to put their “food” into the bag, which represents their stomach.

Step 3: Discuss the questions with the students.

- What are some ways to avoid ending up with excess food items that we don’t want?
- How can event organisers prevent food waste?

CASE STUDY

Beating Food Waste at Fernvale Primary School

- Fernvale Primary School initiated various schemes to reduce food waste, such as food portioning by canteen stalls and organising environmental outreach events.
- Environmental topics were incorporated into the teaching of different subjects.
- P3 students designed food waste reduction posters as part of project work.
- Through these efforts, food waste generated was reduced and students gradually ordered only what they could finish.



A Scout encouraging a fellow student to finish his food.



Decals designed by students remind their peers to reduce food waste.

Challenges to the project:

- **Students' involvement.** The students were not responsive to the school's food waste reduction messages.
- **Cooperation from canteen vendors.** Vendors were sceptical about the effectiveness of offering two portion sizes on their menu.



Tips:

- **Develop consistent publicity materials.** Use posters, table decals, cut-outs and tokens to foster the behaviour of ordering just enough and reducing food waste.



Posters displayed in the canteen reminding students to love their food and not waste a bite.



Food Waste Monitors recording the food waste generated.

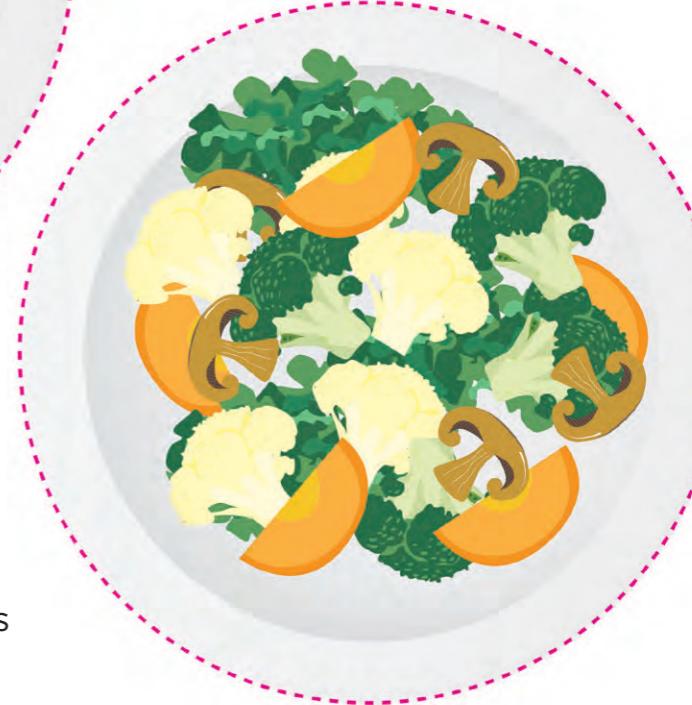
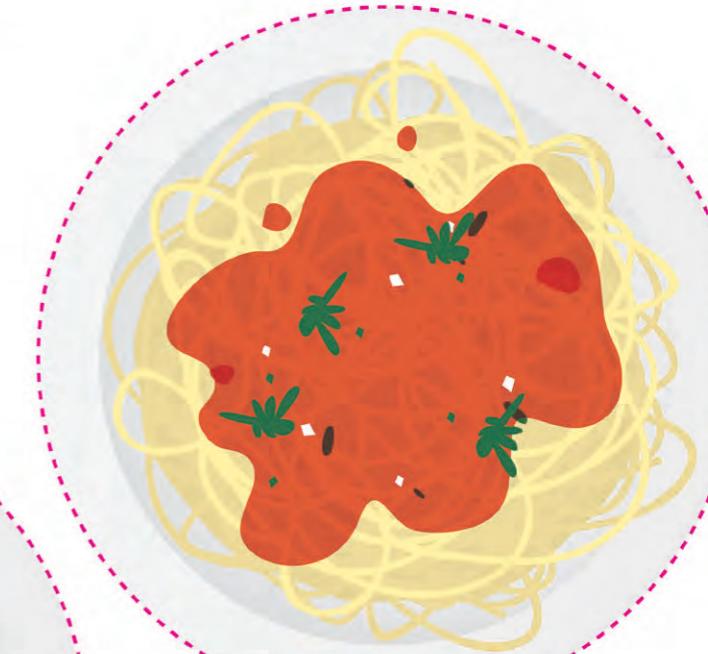
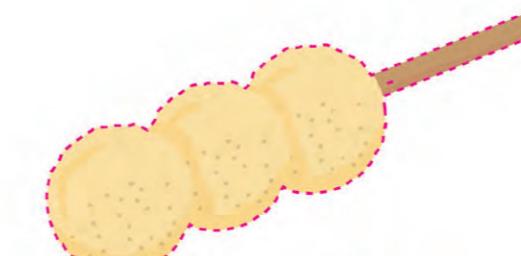
We found the portioning useful as we see the kids waste less. This means we also save money!

*- Mdm Zainab Gani,
Malay Cuisine vendor*



PRINTABLES: BUFFET TIME

Food Props



Print on **A3 paper**, paste on recycled cardboard and cut along the lines. Try using other materials to give props a "3D" effect.



MODULE 4: REDISTRIBUTE FOOD

★ BACKGROUND

Donate excess food to share it with others and reduce food waste.
Non-perishables can be donated instead of being disposed of.

-pencil THINGS YOU CAN DO

Activity 1: Sort your food

Objective: To teach students to differentiate between food items that can and cannot be donated.

Duration: 20 minutes

? What you need:

- 1 food item/prop from each of the 10 categories below.



Activity instructions:

Step 1: Group students into teams of 5 and distribute the 10 food items to each team. Set a time limit (e.g. 10 minutes) for the students to sort which food items can or cannot be donated.

Step 2: Discuss the questions with students.

- Why is it that some foods cannot be donated?
- Why should we donate excess food?

Activity 2: Donate food

Objective: Organise a food donation drive.

Below are some partners you can approach for assistance.



The Food Bank Singapore:
www.foodbank.sg



Food from the Heart:
www.foodfromtheheart.sg



Fei Yue Community Services:
www.fycs.org



Willing Hearts:
www.willinghearts.org.sg



Lions Home for the Elders:
www.lionshome.org.sg



CASE STUDY

Donating Excess Food at Zhonghua Secondary School



The team behind “Donut Waste Food, Lettuce Donate”.

- Students from Zhonghua Secondary School initiated a food waste reduction project called “Donut Waste Food, Lettuce Donate”, in collaboration with The Food Bank Singapore.
- They designed publicity materials, held talks, and conducted food donation drives in their school and at Braddell Heights Community Club.
- Students learnt that by donating instead of discarding excess food, they were contributing to both the environment and society.



“Don’t give up so soon and strive on to the last day to get as many donations!”
– Goh Tze Mian,
teacher-in-charge of the food donation drive



ZHSS students and staff from The Food Bank Singapore.



Challenges to the project:



Students distributing flyers as part of outreach efforts.

- **Shortage of donations.**
Response was lukewarm in the beginning.

Students’ requests of placing food bins at prominent areas were also denied because of security risk.

- **Selection of outreach activities.**
A limited number of activities could be run due to time and capacity constraints. Thus, only impactful activities were selected.

- **Transportation.** Food donations had to be consolidated outside of school. Hence, thorough assessment of logistics and accessibility of the venue was needed.



Tips:



Publicity poster designed by students.

- **Carry out consistent publicity on multiple platforms.**

Conduct the following actions prior to the food donation drive to help boost donations:

- Make assembly announcements.
- Send email blasts.
- Utilise social media.
- Display posters around the school.

- **Time the donation drive.**
Organise the donation drive before or after festive seasons to garner more donations, and hold it over an extended period of time.

- **Plan logistics early.**
Prepare cardboard boxes and a room to store collected food items beforehand.



MODULE 5: RECYCLE FOOD WASTE



BACKGROUND

Segregate and recycle food waste. Composting and food waste recycling turn food waste, such as fruit peels and eggshells, into compost for plants. This closes the loop in the food management cycle.



THINGS YOU CAN DO

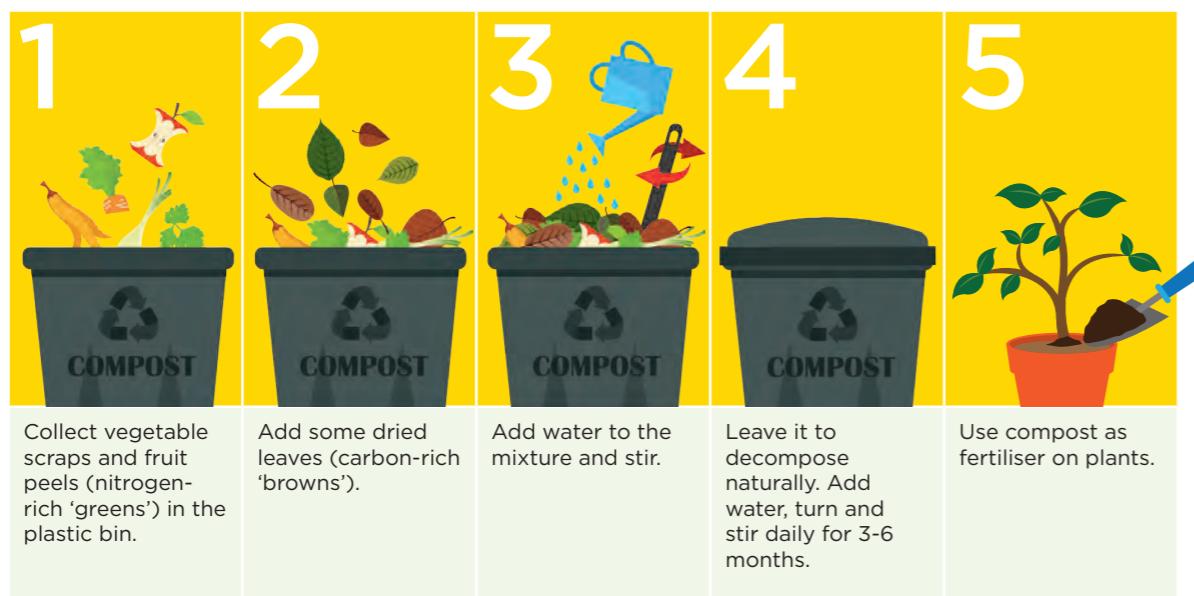
Activity 1: Traditional composting

🎯 **Objective:** To teach students how to make compost.

⌚ **Duration:** More than 3 months

❓ Activity instructions:

- Prepare a black, plastic dustbin with a lid.
- Drill small holes on the lid, bottom and sides of the bin for ventilation.
- Place bin in a well-ventilated area without direct sunlight and elevated from the ground (using bricks or stones).
- Line sides of bin with cardboard to prevent material from coming out through drilled holes.
- Follow the 5 steps below.

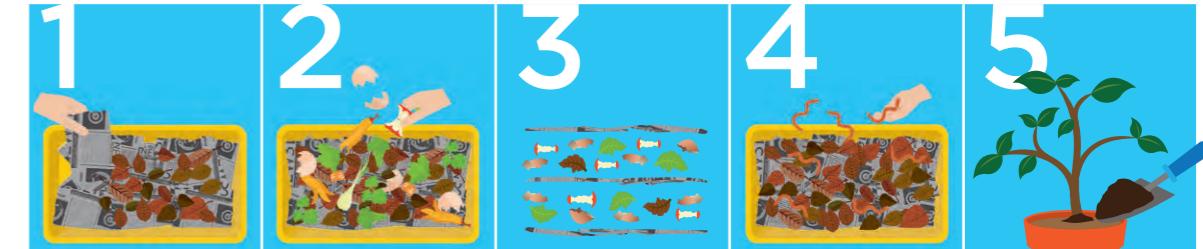


Activity 2: Vermicomposting

🎯 **Objective:** To teach students how to make compost using earthworms.

⌚ **Duration:** 1-3 months

❓ What you need and activity instructions:



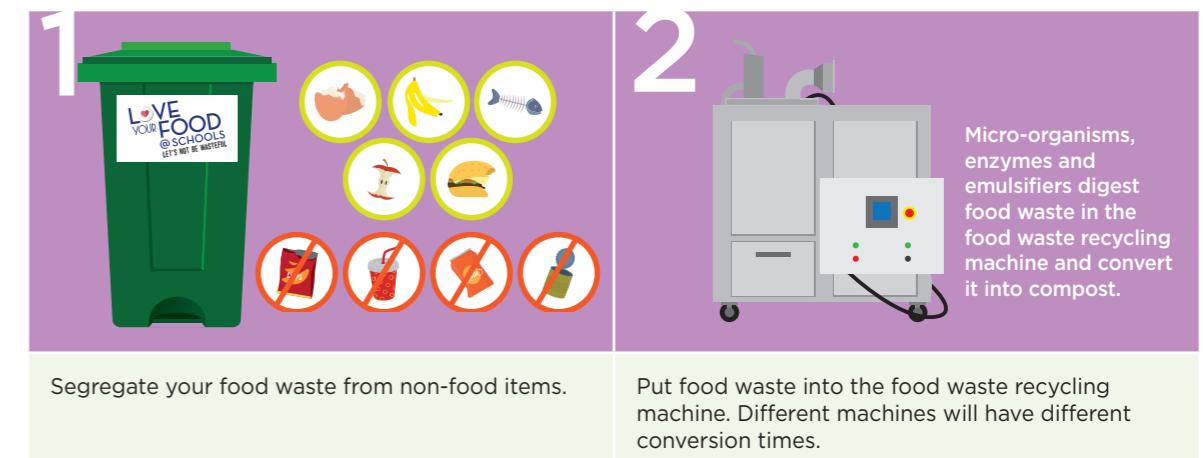
Put in dampened bedding materials eg. newspaper strips in a bin.	Add in eggshells and vegetable scraps (nitrogen-rich 'greens').	Alternate the layers but ensure that the topmost layer is made up of dampened bedding materials.	Add the earthworms ¹ (e.g. Red Wiggler worms, Malaysian blue worms and European night crawlers) and close the lid.	The earthworms will feed on mixture and pass out worm castings. Collect worm castings in 1-3 months for use on plants.
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Activity 3: Recycling food waste with machines

🎯 **Objective:** To teach students how compost can be made using a food waste recycling machine.

Food waste recycling using a machine:



You may plan a visit to premises that use food waste digesters, e.g. Our Tampines Hub (our_tampines_hub@pa.gov.sg).

¹ Earthworms can be purchased at www.ogreenliving.com, www.organicorigins.com.sg/compostworms.php, www.facebook.com/lim-vertical-culture-pte-ltd-714846801992455

Disclaimer

This list of companies is non-exhaustive and is for reference. Inclusion in this list does not constitute license, endorsement or recommendation by NEA. For more information, please contact the companies.



CASE STUDY

1. Vermicomposting project at ITE College East

- In 2016, the Green Club members and landscaping students at ITE College East teamed up to recycle food waste from the fruit stall by feeding them to earthworms.
- Students generated 3.5kg of castings fortnightly to fertilise plants.
- They learnt that food waste can be converted to a useful product.



Harvesting worm castings.



Harvesting worm castings.



Fertilising a papaya plant with the worm castings.

I never knew we could recycle food waste, but now I know earthworms can eat them and we can use the castings to grow even more delicious fruits and vegetables!

- Nah Yi Xian, Landscaping student



Challenges to the project:

- Storage.** The earthworms propagated rapidly and storage soon became an issue.
- Commitment.** A high level of care and dedication was put in to make the vermicomposting project successful.



Tips:

- Limit earthworm population growth.** Reduce food waste fed to earthworms so they reproduce less rapidly.
- Motivate the students.** Guide students proactively and patiently on caring for the earthworms.
- Structure a care schedule.** Create a roster to detail the duties of students and canteen vendors for seamless operation of the wormery.
- Form partnerships.** Approach and partner existing practitioners of vermicomposting, such as Siloso Beach Resort, to provide basic wormery ingredients and training.



Malaysian blue earthworms.

2. Recycling Food Waste at Chongzheng Primary School

- Chongzheng Primary School was a participant in the 'Love Your Food @ Schools' project that promoted a closed-loop food management system.
- Everyone in school segregated their food waste, which was then deposited into a food waste recycling machine and converted into compost for school's use or distribution to visitors and community gardens.
- Students became more conscious of the need to reduce food waste and the school's food waste was reduced by approximately 40%.



Students segregating food waste.



Challenges to the project:

- **Food waste segregation.** Initially, students and canteen vendors were not used to sorting their food waste.
 - **Commitment.** The school faced manpower constraints as the project required a whole-school effort on a daily basis.
 - **Compost supply.** As the machine was operated daily, the school ended up with an oversupply of compost at one point.



Tips:



Canteen vendor segregating food waste.



Fertilising the school garden with compost.

- **Activate student leaders.** Task student leaders to remind their peers to segregate food waste properly.
 - **Guide the canteen vendors and students.**
Teachers can conduct briefings to inculcate the segregation habit in the canteen vendors.

For students, place the food waste collection bins close to general waste bins or return points for convenience. Clearly mark the food waste bins (e.g. with a big prominent sign or with a red lid).
 - **Develop consistent publicity materials.** Create posters of acceptable food waste to serve as visual reminders.
 - **Form partnerships.** Establish community partnerships, such as with a nearby garden to distribute the compost.

Oversupply can be further managed through distribution to students' families.



We found that students are more aware of food waste reduction. The school's food waste has reduced from 16.8kg to less than 10kg every day!

- Eunice Bor,
teacher-in-charge of
'Love Your Food @ Schools Project'

NOTES

ROLES & RESPONSIBILITIES

Working towards zero waste in schools requires collaboration and communication between the different stakeholders.

Each stakeholder should be aware of the food waste recycling process in place and work together when problems arise. Knowing his/her roles and responsibilities will help prepare the school for different scenarios.

This table can be used as a guide of the activities required. To ensure sufficient support, you may wish to assign the relevant officers/stakeholders to the different roles.

	Roles and Responsibilities
School Leader/s	<p>□ Planning</p> <ul style="list-style-type: none"> Form a Food Waste Reduction (FWR) Committee to drive FWR programmes. Appoint suitable school personnel to oversee the food waste recycling system (if any). Meet with the FWR Committee to establish goals for the term and review the programme regularly (e.g. once a term). <p>□ Communication</p> <ul style="list-style-type: none"> At the beginning of a school term, explain FWR messages and the programme to teachers and students. Throughout the year, make announcements to remind the school to reduce, segregate and recycle food waste. At school-wide events, communicate FWR plans and profile the FWR Committee and supporting staff and students.. <p>□ Education</p> <ul style="list-style-type: none"> Encourage teachers to integrate NEA's FWR resources into their lessons.

Assign the relevant officers/stakeholders to the different roles to ensure sufficient support of the activities required.



	Roles and Responsibilities
WR Committee Members and/or supporting school personnel	<p>□ Planning</p> <ul style="list-style-type: none"> Plan and propose the school's FWR plan to the school leaders. Oversee and train the appointed personnel to manage the food waste recycling system (if any). Train and work with environment champions/student leaders to advocate FWR to their peers. Meet up with stakeholders (e.g. Principal, Vice Principal, teachers, vendors, canteen manager, OM) once every term to gather feedback. <p>□ Segregation (for food waste recycling)</p> <ul style="list-style-type: none"> Plan and monitor the setup of the waste segregation bins/stations Ensure the school has necessary resources (posters, decals, bins) and deploy them around the school. Schedule environment champions/student leaders to ensure that food waste is segregated properly during recess and lunch times. Involve cleaners to maintain the cleanliness of the segregation areas. <p>□ Communication</p> <ul style="list-style-type: none"> At the beginning of the school term, explain FWR and segregation procedures to all students and staff through posters, assembly programmes, and announcements. Throughout the school term, make announcements and conduct FWR educational campaigns. <p>□ Education</p> <ul style="list-style-type: none"> Integrate NEA's FWR resources into lessons.
Vendors	<p>□ Planning</p> <ul style="list-style-type: none"> Attend FWR committee meetings. Provide options of <ul style="list-style-type: none"> - Serving different food portion sizes so that diners can choose to order only what they can finish. - Swapping sides so that diners can request a replacement for a side that they do not eat <p>□ Segregation (for food waste recycling)</p> <ul style="list-style-type: none"> Segregate food waste into a separate bin during food preparation and at the end of the day.
Students	<p>□ Segregation (for food waste recycling)</p> <ul style="list-style-type: none"> During recess and lunch times, ensure only food waste is deposited into the food waste bin, and demonstrate how to segregate properly, if needed. Help appointed school personnel with the daily weighing and tracking of the weight of food waste. Help appointed school personnel in managing the food waste recycling machine/system. Weigh and pack compost for distribution. <p>□ Communicate</p> <ul style="list-style-type: none"> Share FWR and segregation message with friends. Design FWR communication materials such as posters or decals and place them in the canteen. <p>□ Education</p> <ul style="list-style-type: none"> Share your FWR experiences at an assembly talk with the school. Help school personnel in FWR outreach activities.



ACKNOWLEDGEMENTS

We would like to thank the following schools and organisations for their contributions to food waste reduction:

Schools in the ‘Love Your Food @ Schools’ Project:

- Admiralty Primary School
 - Anchor Green Primary School
 - Broadrick Secondary School
 - Chongzheng Primary School
 - Dunman High School
 - Greendale Primary School
 - Greenwood Primary School
 - Hillgrove Secondary School
 - Nan Hua High School
 - Punggol Primary School

Content contributors:

- Fernvale Primary School
 - Institute of Technical Education (ITE) College East
 - Spectra Secondary School
 - Zhonghua Secondary School

More resources:

Visit **cgs.gov.sg/resources** for food waste reduction presentation slides and Captain Green videos and posters.



NOTES

An initiative by

