National Design Project
2023

Eco-Smart: Reducing Food Waste with AI-Powered Composting

DESIGN TINKERS from Edgefield Primary School

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Doing our part to reduce Food Waste

- Food waste is one of the biggest waste streams in Singapore and the amount of food waste generated has grown by 20% over the last 10 years.

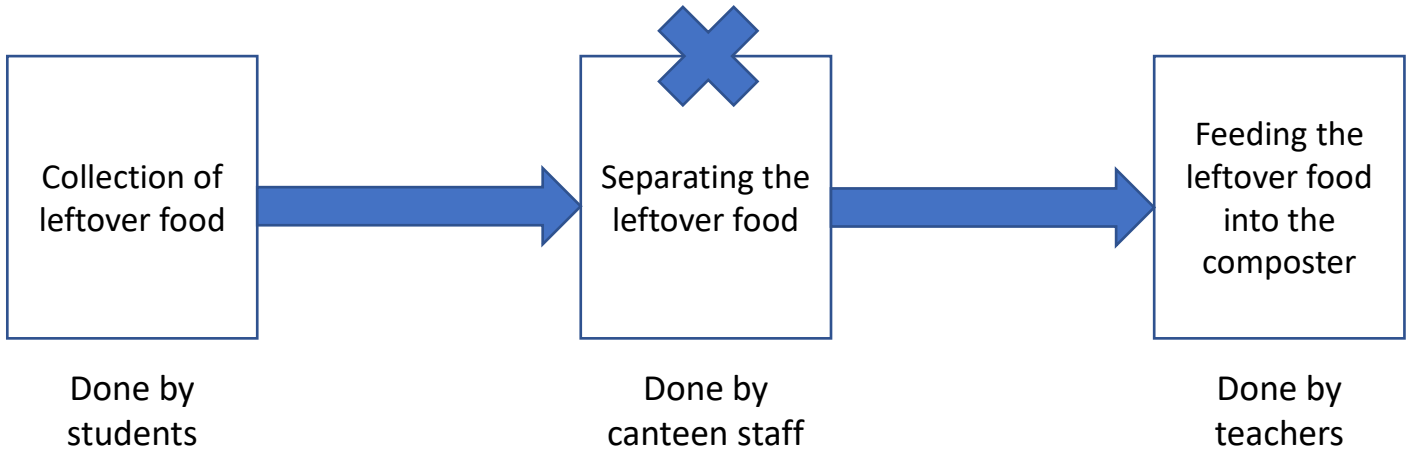
- When food is wasted, so are all of the resources used to grow, deliver and to dispose it. This increases our carbon footprint, contributing to global warming and climate change.

The Challenge

- Our school wanted to reduce the amount of food waste generated in our canteen through food composting. The compost will be used to fertilise the edible garden in our school.

- However, we realized that the leftover food are not being separated properly.

The Collection Process



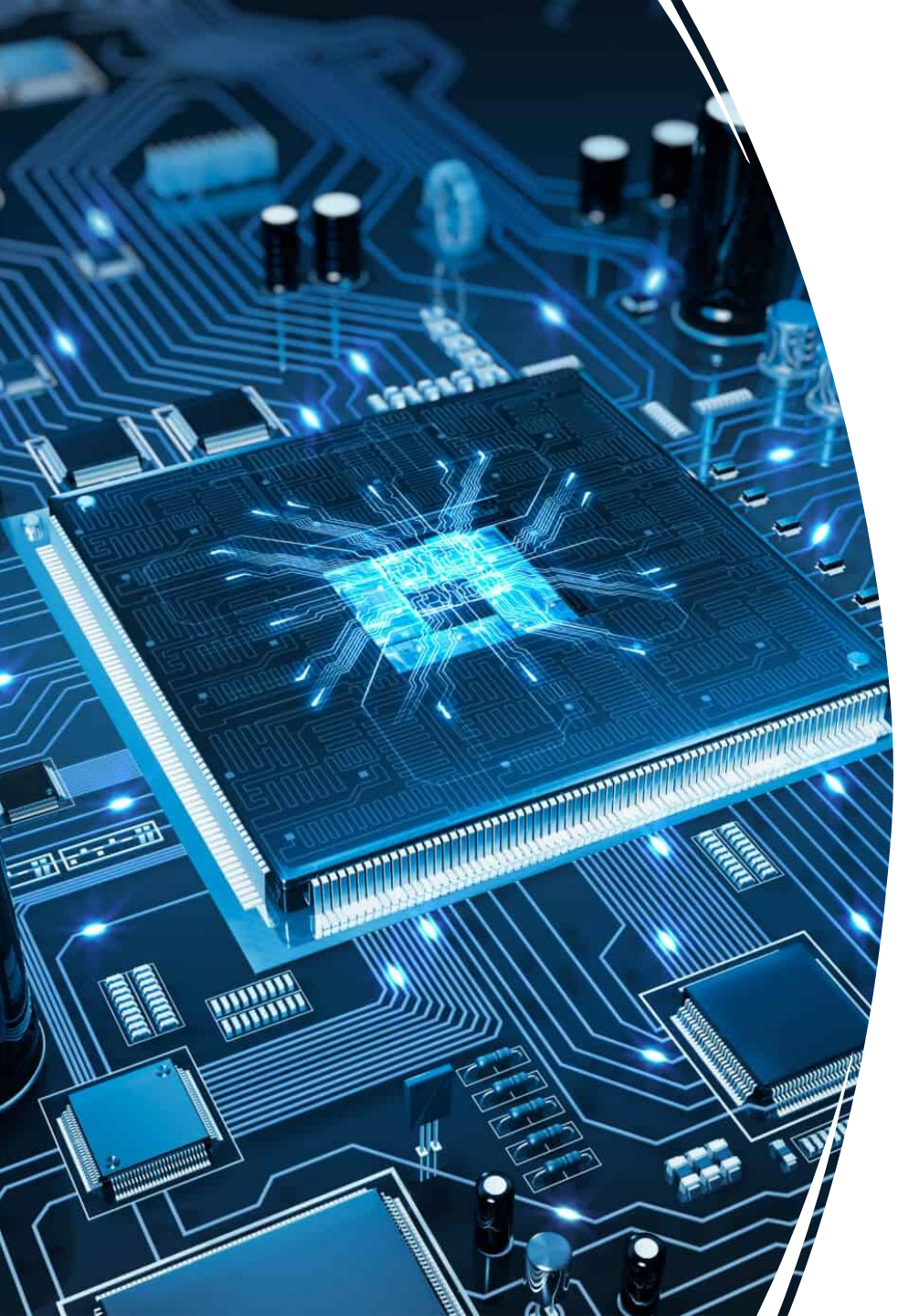
- Idea! We can solve this problem by separating the leftover food ourselves.

The Problem Statement

How might we improve the process of separating leftover food for our food compost without the help of canteen staff.

Our Solution

- We can empower our school mates to separate their own unfinished food through A.I. technology.
- Through the use of A.I. recognition, our prototype machine will identify the type of unfinished food and instruct our school mates to dispose the food into the correct bins.

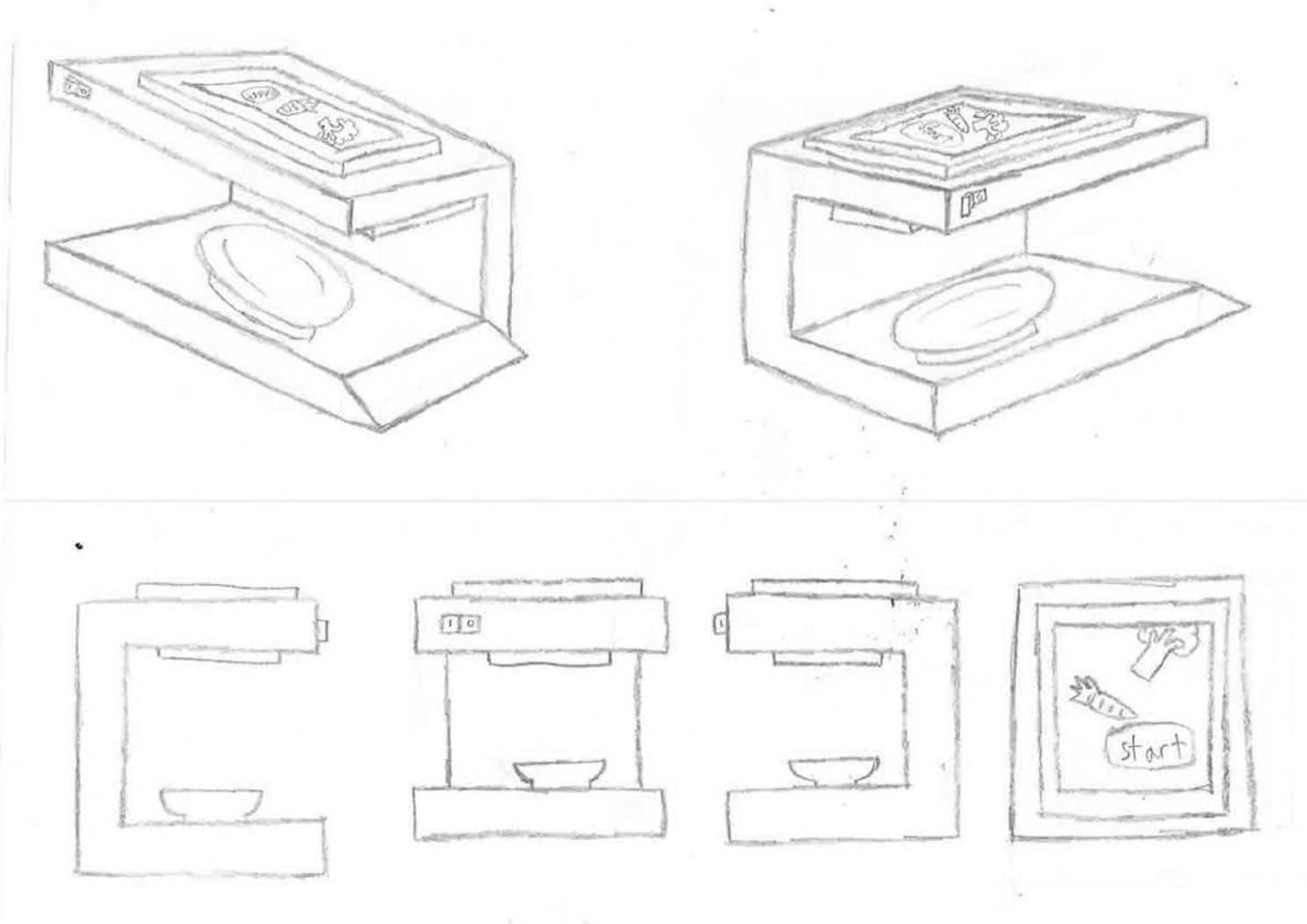


How does A.I. work in our solution?

Through the use of A.I. camera, our prototype will:

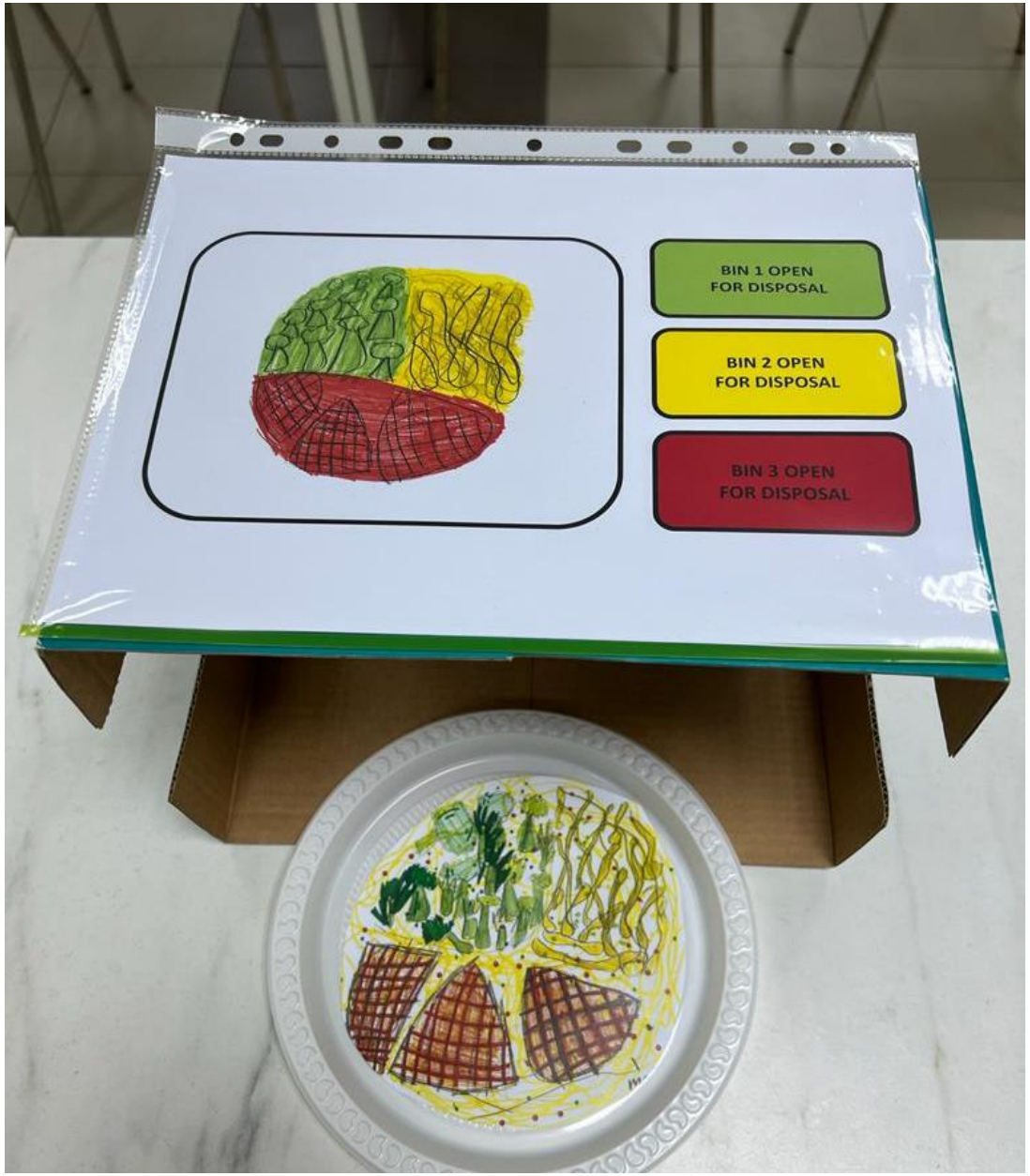
1. Collect images of the unfinished food
2. Recognize the types of leftover food
3. Instruct how the leftover food should be separated
4. Control the bins which the leftover food are disposed in

Drawing of our prototype machine (before building)



Our prototype A.I. assisted food separation machine

(Top View)



Our prototype A.I. assisted food separation machine

(Front View)

Our prototype A.I. assisted food separation machine

(Side View)

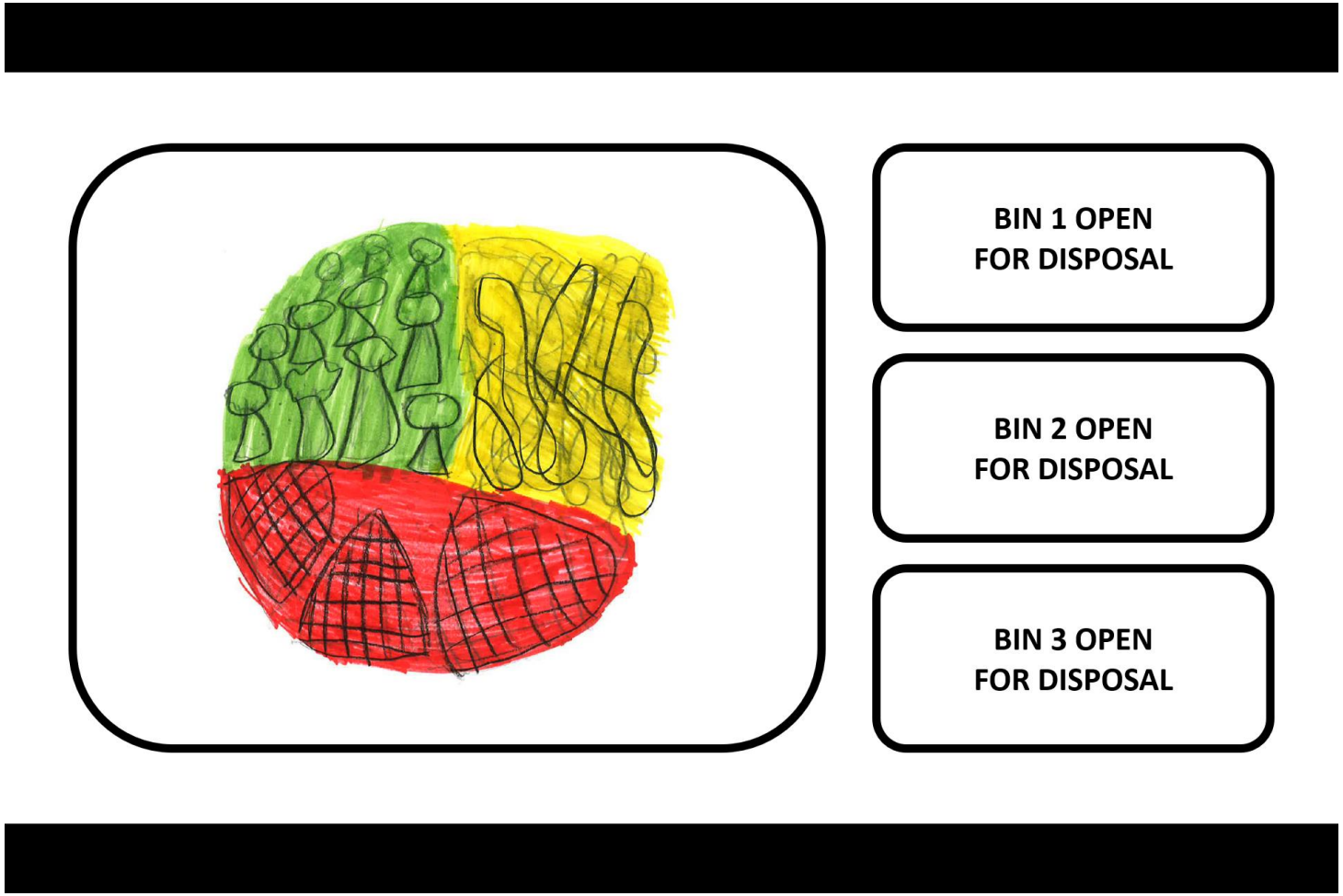
How does the food separation machine work?

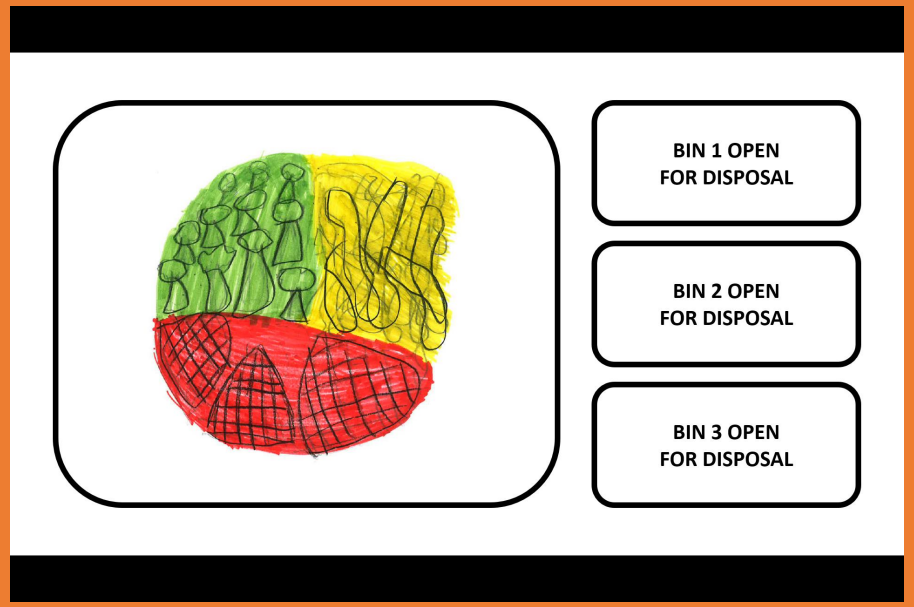
Prototyping

INFORMATION SHOWN ON DISPLAY WHEN LEFTOVER FOOD ARE PROPERLY SEPARATED FOR SCANNING.

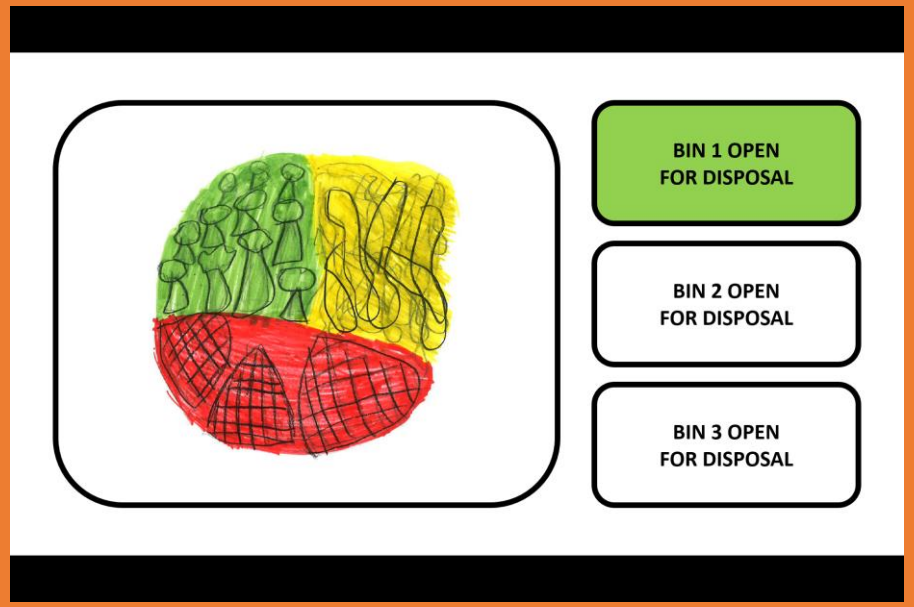
- Once the leftover food are separated, the screen will capture the image and colour the separated portions.

- The coloured bins will also be unlocked one at a time so students can follow the steps easily.




BIN 1 OPEN
FOR DISPOSAL
BIN 2 OPEN
FOR DISPOSAL
BIN 3 OPEN
FOR DISPOSAL

1


BIN 1 OPEN
FOR DISPOSAL
BIN 2 OPEN
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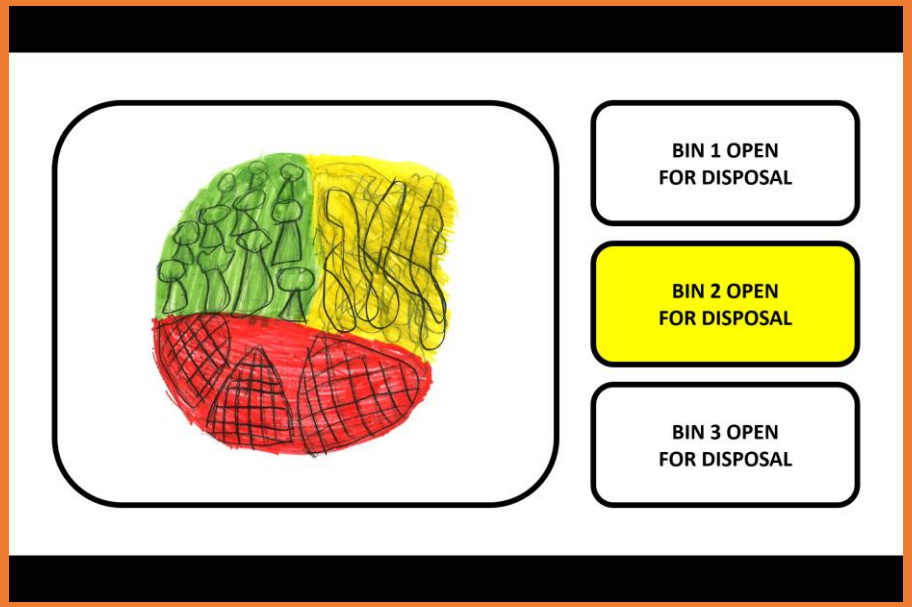
BIN 1 OPEN
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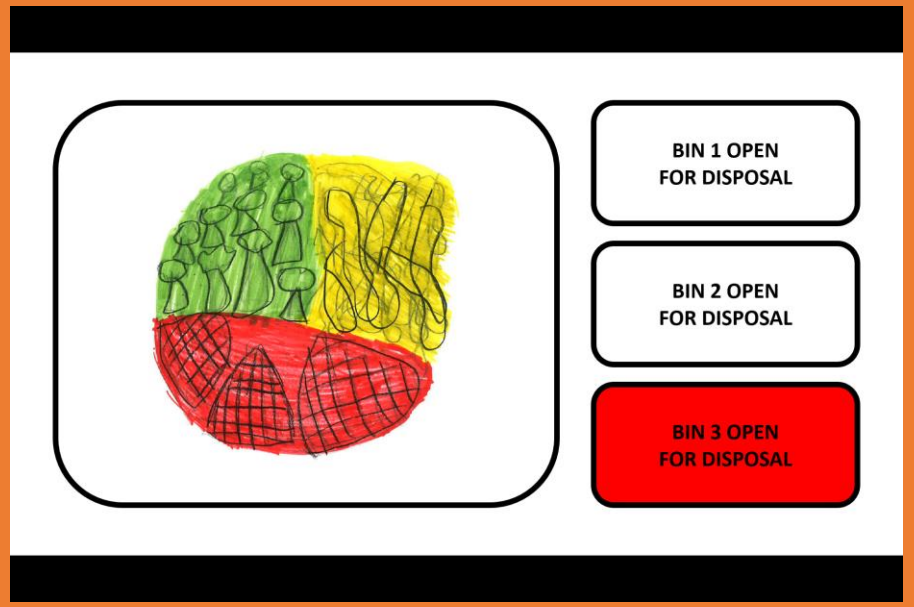
BIN 1 OPEN
FOR DISPOSAL
BIN 2 OPEN
FOR DISPOSAL
BIN 3 OPEN
FOR DISPOSAL

4

ALERT MESSAGE WHEN LEFTOVERS FOOD ARE NOT SEPARATED DURING SCANNING.

- When the leftover food are not separately properly, the screen will alert the school mate disposing the food.

- The bins will also be locked so food disposal cannot take place.

Other benefits from our solution

When students are tasked to separate the leftover food, they will:

1. Realise how difficult and unpleasant the task of separating leftover food is.
2. Notice the type of food they do not finish eating so they can order less in future.
3. Be more responsible in their actions.

End of Presentation.
Thank You!