



# Yio Chu Kang Secondary School



## ***Design & Enterprise Department Programme and Subject Information***

# The Intent

The purpose of this briefing is to communicate subject expectations as well as post-secondary and career options so as that you can make informed decisions (when exercising subject options for Secondary 3).



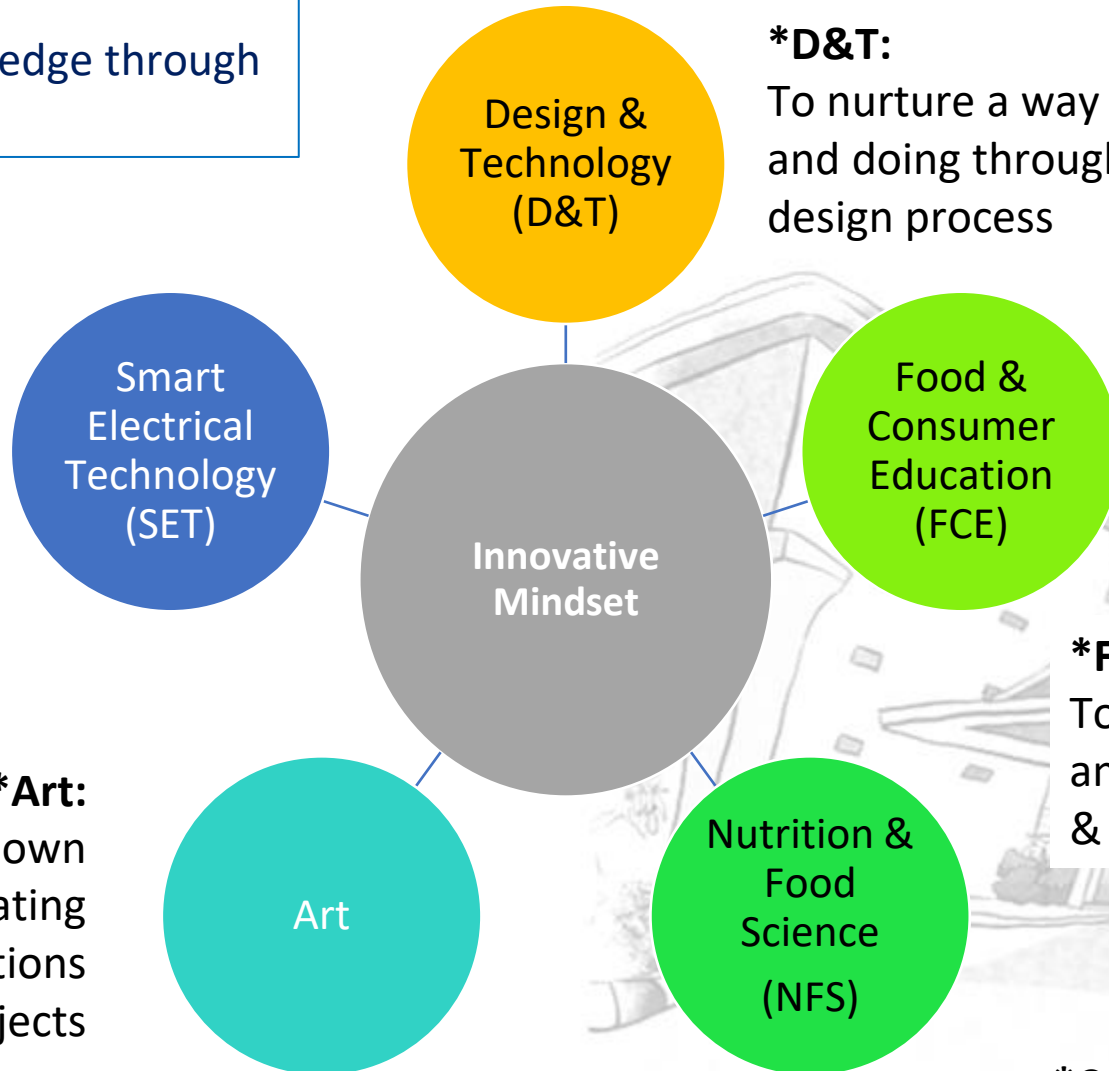
# The Rationale

## Applied Learning:

To visualise and construct knowledge through hands-on learning.

**SET:**  
To connect to current and future needs of industries in an immediate and explicit manner

**\*Art:**  
To reflect and create own uniqueness by communicating thoughts and emotions through images/objects



**\*D&T:**  
To nurture a way of thinking and doing through the design process

**\*FCE/NFS:**  
To respond to new lifestyle and consumer trends – health & financial management

Official (Closed) / Non-Sensitive

**\*Coursework Subjects**



# An overview (2024)

Coursework Subjects	Lower Secondary	Upper Secondary*
Art	Sec 1 Sec 2	Sec 3 E Sec 4, 5 N(A)
Design & Technology (D&T)		Sec 3 E, N(A) & N(T) Sec 4 E, N(A) & N(T) Sec 5 N(A)
Food & Consumer Education (FCE)/ Nutrition and Food Science (NFS)		Sec 3 E, N(A) Sec 4 E
Non- Coursework Subjects	Lower Secondary*	Upper Secondary*
Smart Electrical Technology (SET)	---	Sec 3 & 4 N(T)

\* E- Express; N(A)- Normal (Academic); N(T)- Normal (Technical)



# Post-Secondary Options

L1R5 : For Junior College Course	
L1	First Language - English/Higher Mother Tongue
R5	Relevant Subject 1 - Humanities/Higher Art/Higher Music/Malay (Special Programme)/ Chinese (Special Programme)/Bahasa Indonesia
	Relevant Subject 2 - Mathematics/Science
	Relevant Subject 3 - Humanities/Higher Art/Higher Music/Mathematics/ Science/ Malay (Special Programme)/Chinese (Special Programme)/ Bahasa Indonesia
	Relevant Subject 4 - Any GCE 'O' Level subjects (except Religious Knowledge)
	Relevant Subject 5 - Any GCE 'O' Level subjects (except Religious Knowledge)

L1R4 : For Millennia Institute Course	
L1	First Language - English/Higher Mother Tongue
R4	Relevant Subject 1 - Humanities/Higher Art/Higher Music/Mathematics/ Science/ Malay (Special Programme)/Chinese (Special Programme)/ Bahasa Indonesia
	Relevant Subject 2 - Humanities/Higher Art/Higher Music/Mathematics/ Science/ Malay (Special Programme)/Chinese (Special Programme)/ Bahasa Indonesia
	Relevant Subject 3 - Any GCE 'O' Level subjects (except Religious Knowledge)
	Relevant Subject 4 - Any GCE 'O' Level subjects (except Religious Knowledge)



# Post-Secondary Options

Nutrition and Food Science

A- Arts & Humanities; B- Business; C- Science & Technology; D-Design

		ELR2B2 : For Polytechnic Courses			
Aggregate Type		ELR2B2 -A	ELR2B2-B	ELR2B2-C	ELR2B2-D
EL		English			
R2	2nd Group of Relevant Subjects	Additional Mathematics Art/Art & Design Business Studies Chinese Combined Humanities Commerce Commercial Studies Creative 3D Animation Design & Technology Design Studies Economics Elementary Mathematics Nutrition and Food Science Geography Higher Art Higher Chinese Higher Malay Higher Music Higher Tamil	Art / Art & Design Business Studies Combined Humanities Commerce Commercial Studies Economics Geography Higher Art Higher Music History Intro to Enterprise Development Literature in English Literature in Chinese Literature in Malay Literature in Tamil Media Studies (English) Media Studies (Chinese) Music Principles of Accounts	Add <sup>d</sup> Combined Science Additional Science Biology Biotechnology Chemistry Combined Science Computer Studies Creative 3D Animation Design & Technology Engineering Science Nutrition and Food Science Fundamentals of Electronics General Science Human & Social Biology Integrated Science Physics Physical Science Science (Chem, Bio) Science (Phy, Bio)	Add <sup>d</sup> Combined Science Additional Science Art / Art & Design Biology Biotechnology Chemistry Combined Science Computer Studies Creative 3D Animation Design & Technology Design Studies Engineering Science Nutrition and Food Science Fundamentals of Electronics General Science Higher Art Human & Social Biology Integrated Science Media Studies (English)





# Poly Foundation Programme (PFP)

- Applicable for 4N(A) students
- Obtained a raw score of 12 points or better, excluding CCA bonus points for ELMAB3
- Meet the min. grade for Group 1 or Group 2 courses

One of the relevant subjects	Group 1 (Science & Tech)	Group 2 (Non-Science & Tech)
Art		3
Design & Technology	3	
Food & Nutrition	3	





# Art



Official (Closed) / Non-Sensitive





# Art – Curriculum Objectives

Students are expected to develop understanding in:

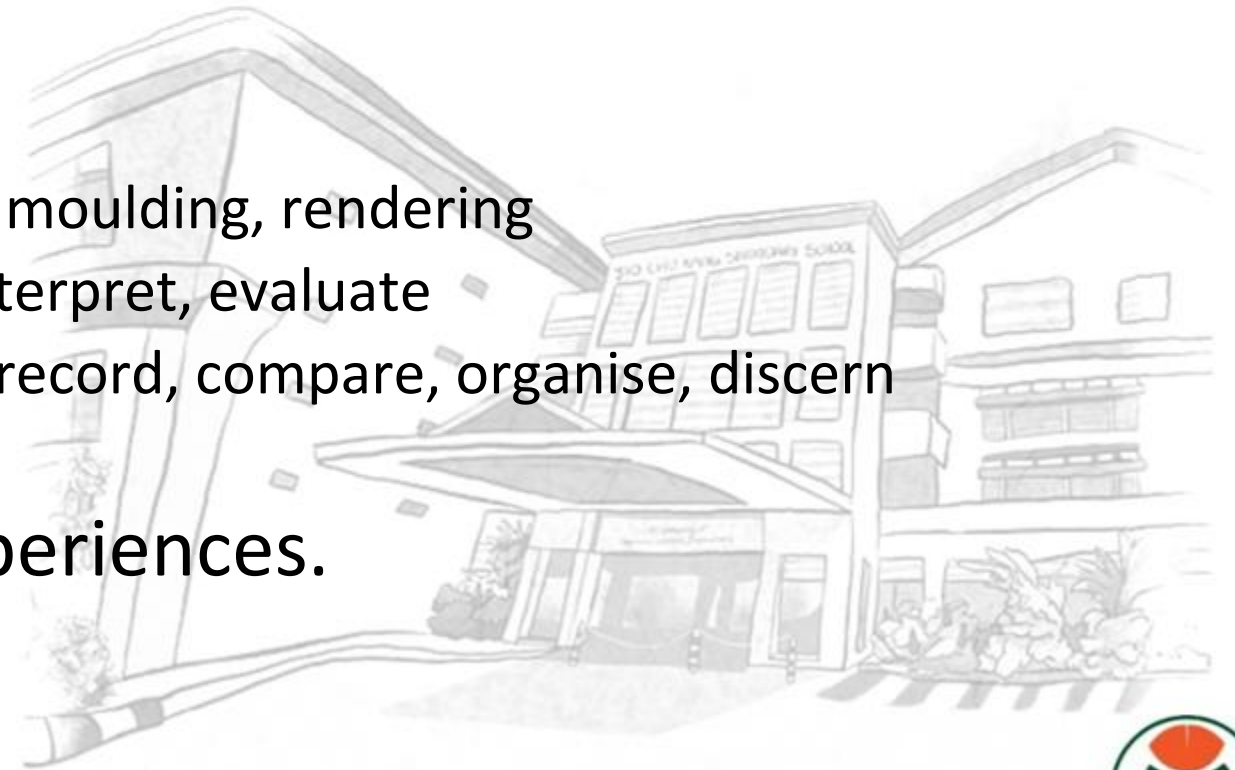
- **Subject Content:**

- Studio Practice: creation of artworks.

- **Process Skills:**

- Communication - Drawing, painting, moulding, rendering
- Visual Inquiry – describe, analyse, interpret, evaluate
- Research and Processing – observe, record, compare, organise, discern

to give form to ideas and experiences.



# Assessment

Course (Syllabus Code)	Express (6123)	Normal (Academic) (6125)	Duration	Weighting
Paper 1	<u>Coursework</u> A final artwork; and Not more than <b>eight</b> sheets of A2 preparatory studies	<u>Coursework</u> A final artwork; and Not more than <b>five</b> sheets of A2 preparatory studies	Jan – Mid Sep [O-Level]	<b>60%</b>
			Jan – End July [N(A)]	
Paper 2	<u>Drawing &amp; Painting</u> Question Paper given 3 weeks before the start of GCE O-Level Exam Response to 1 of the themes with <b>three to five</b> A3 pieces of preparatory studies	<u>Drawing &amp; Painting</u> Question Paper given 3 weeks before the start of GCE N-Level Exam Response to 1 of the themes with <b>three to five</b> A3 pieces of preparatory studies	3 hours	<b>40%</b>



# Post-Secondary and Career Options

Institutions	Courses**
Polytechnics	Business & Management, Humanities, Media and Design
ITE	Design & Media

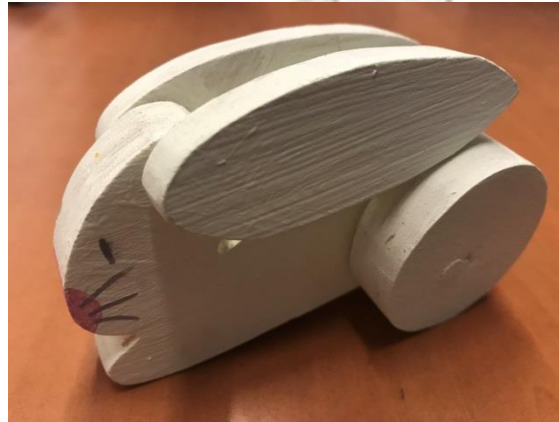
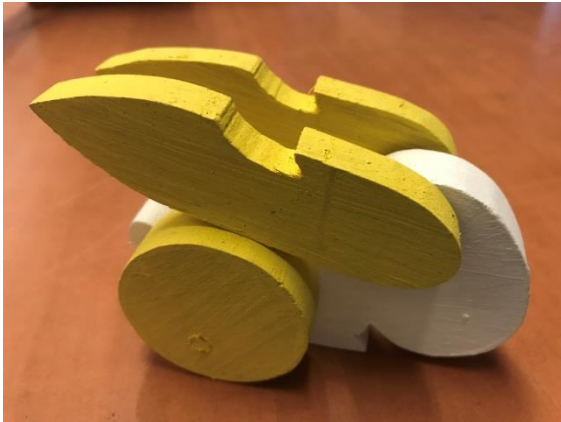
## Career Prospects\*\*

Commercial / Fine Artist, Game and Level Designers, Graphic Designers, 3D Animators, Multimedia Producers, Storyboard Artists, Fashion Buyers, Product Designers etc.

*\*\* This list of courses/career prospects is non exhaustive.*



# Design & Technology



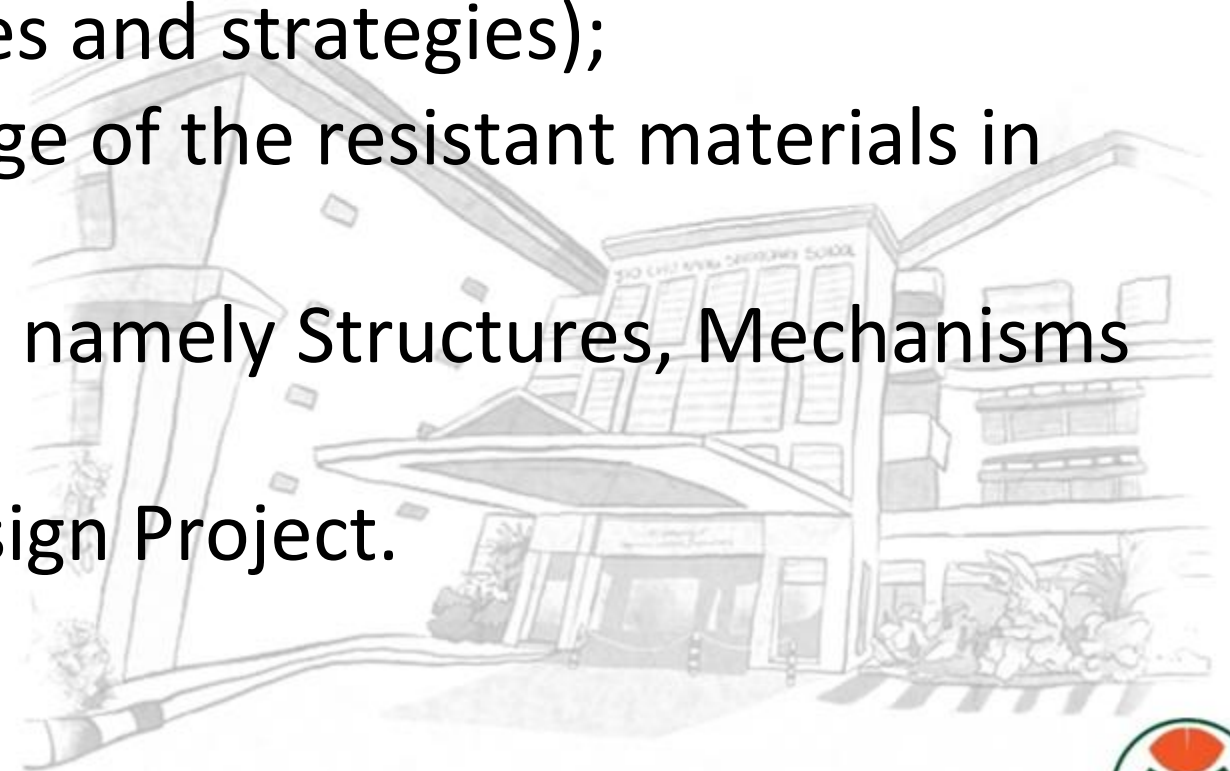
# D&T – Curriculum Objectives

Students are expected to develop understanding in:

## **Subject Content:**

- Design Method (techniques and strategies);
- A sound working knowledge of the resistant materials in plastics, metal and wood;
- Three technological areas, namely Structures, Mechanisms and Electronics;

before embarking on the Design Project.





# D&T – Curriculum Objectives

Students are expected to develop understanding in:

- **Process Skills:**

- Designing (Visualise, Explore, Develop, Present and Communicate Ideas);
- Drawing/Sketching; and
- Making (Use of tools and machineries).



# Assessment – D&T Coursework

Paper	Express (7059)	Normal (Academic) (7055)	Normal (Technical) (7062)	Examination Duration	Weighting
1	Written Paper	Written Paper	Written Paper	2 hours [O-Level]	40%
				1.5 hours [N(A)]	
				1 hour [N(T)]	30%
2	Design Project - A3 Journal, Presentation Boards & Artefact	Design Project - A3 Journal, Presentation Boards & Artefact	Design Project - A3 Journal, Presentation Boards & Artefact	Jan – end Jul (22 weeks) [O-Level]	60%
				Jan- mid Jul (20 weeks) [N(A)]	
				Jan- mid Jul (20 weeks) [N(T)]	70%



# Post-Secondary Options

A- Arts & Humanities;

B- Business;

C- Science & Technology;

D-Design

		ELR2B2 : For Polytechnic Courses			
Aggregate Type		ELR2B2 -A	ELR2B2-B	ELR2B2-C	ELR2B2-D
EL		English			
R2	2nd Group of Relevant Subjects	Additional Mathematics Art/Art & Design Business Studies Chinese Combined Humanities Commerce Commercial Studies Creative 3D Animation Design & Technology Design Studies Economics Elementary Mathematics Food & Nutrition Geography Higher Art Higher Chinese Higher Malay Higher Music Higher Tamil	Art / Art & Design Business Studies Combined Humanities Commerce Commercial Studies Economics Geography Higher Art Higher Music History Intro to Enterprise Development Literature in English Literature in Chinese Literature in Malay Literature in Tamil Media Studies (English) Media Studies (Chinese) Music Principles of Accounts	Add <sup>d</sup> Combined Science Additional Science Biology Biotechnology Chemistry Combined Science Computer Studies Creative 3D Animation Design & Technology Engineering Science Food & Nutrition Fundamentals of Electronics General Science Human & Social Biology Integrated Science Physics Physical Science Science (Chem, Bio) Science (Phy, Bio)	Add <sup>d</sup> Combined Science Additional Science Art / Art & Design Biology Biotechnology Chemistry Combined Science Computer Studies Creative 3D Animation Design & Technology Design Studies Engineering Science Food & Nutrition Fundamentals of Electronics General Science Higher Art Human & Social Biology Integrated Science Media Studies (English)



# Post-Secondary and Career Options

Institutions	Courses**
Polytechnics	Applied Sciences, Built Environment, Engineering, Health Sciences, Information & Digital Technologies, Maritime Studies, Media & Design
ITE	Applied Sciences, Electronics and Info-Comm Technologies, Engineering

## Career Prospects\*\*

Electrical/Product/Process Engineer, Programmer, Hardware/Software Developers, 3D Designers, CADD Specialist, Draughtsman, Facility Management Engineer etc.

*\*\*This list of courses/career prospects is non exhaustive.*





# Nutrition and Food Science (NFS)

Food and Consumer Education (FCE)

Nutrition and Food Science (NFS) *[New in 2021; Examination in 2022]*

Nutrition and Food Science (NFS) (NT) *[New in 2022; Examination in 2023]*





# NFS – Curriculum Objectives

Students are expected to develop understanding in:

- **Subject Content:**

- concepts of nutrition and meal planning;
- the link between diet and health; and
- food science;

so that students are able to make informed food choices and in creating healthier food products.



# NFS – Curriculum Objectives

Students are expected to develop understanding in:

- **Process Skills:**

- Balanced Diet in Meal Planning;
- Food (Cooking and Food Preparation); and
- Report Writing

to plan and prepare healthy meals using a variety of food commodities and methods of cooking.



# Assessment – NFS Coursework

Paper	Description	Duration	Weighting
1	Written Paper [O Level]	2 hours [O Level]	40%
	Written Paper [N(A) Level]	1.5 hours [N(A) Level]	
2	Coursework 20-25 pages [O Level]*	Jan to End Jul (28 hours)	60%
	Coursework 15-20 pages [N(A) Level]*	Jan to Early Jul (25 hours)	

Paper	Description	Duration	Weighting
1	Written Paper	1.5 hours [N(T) Level]	40%
2	Coursework Not more than 15 pages [N(T) Level]*	Jan to Early Jul [N(T) Level]	60%

\*Revised



# Post-Secondary Options

A- Arts & Humanities; B- Business; C- Science & Technology; D-Design

		ELR2B2 : For Polytechnic Courses			
Aggregate Type		ELR2B2 -A	ELR2B2-B	ELR2B2-C	ELR2B2-D
EL		English			
R2	2nd Group of Relevant Subjects	Additional Mathematics Art/Art & Design Business Studies Chinese Combined Humanities Commerce Commercial Studies Creative 3D Animation Design & Technology Design Studies Economics Elementary Mathematics <b>Nutrition and Food Science</b> Geography Higher Art Higher Chinese Higher Malay Higher Music Higher Tamil	Art / Art & Design Business Studies Combined Humanities Commerce Commercial Studies Economics Geography Higher Art Higher Music History Intro to Enterprise Development Literature in English Literature in Chinese Literature in Malay Literature in Tamil Media Studies (English) Media Studies (Chinese) Music Principles of Accounts	Add <sup>d</sup> Combined Science Additional Science Biology Biotechnology Chemistry Combined Science Computer Studies Creative 3D Animation Design & Technology Engineering Science <b>Nutrition and Food Science</b> Fundamentals of Electronics General Science Human & Social Biology Integrated Science Physics Physical Science Science (Chem, Bio) Science (Phy, Bio)	Add <sup>d</sup> Combined Science Additional Science Art / Art & Design Biology Biotechnology Chemistry Combined Science Computer Studies Creative 3D Animation Design & Technology Design Studies Engineering Science <b>Nutrition and Food Science</b> Fundamentals of Electronics General Science Higher Art Human & Social Biology Integrated Science Media Studies (English)



# Post-Secondary & Career Options

Institutions	Courses**
Polytechnics	Applied Sciences, Business & Management (Food & Beverage Business), Health Sciences
Shatec	Culinary Skills, Pastry and Baking
ITE	Pastry & Baking; Food & Beverage Operations Western Culinary Arts; Asian Culinary Arts

## Career Prospects\*\*

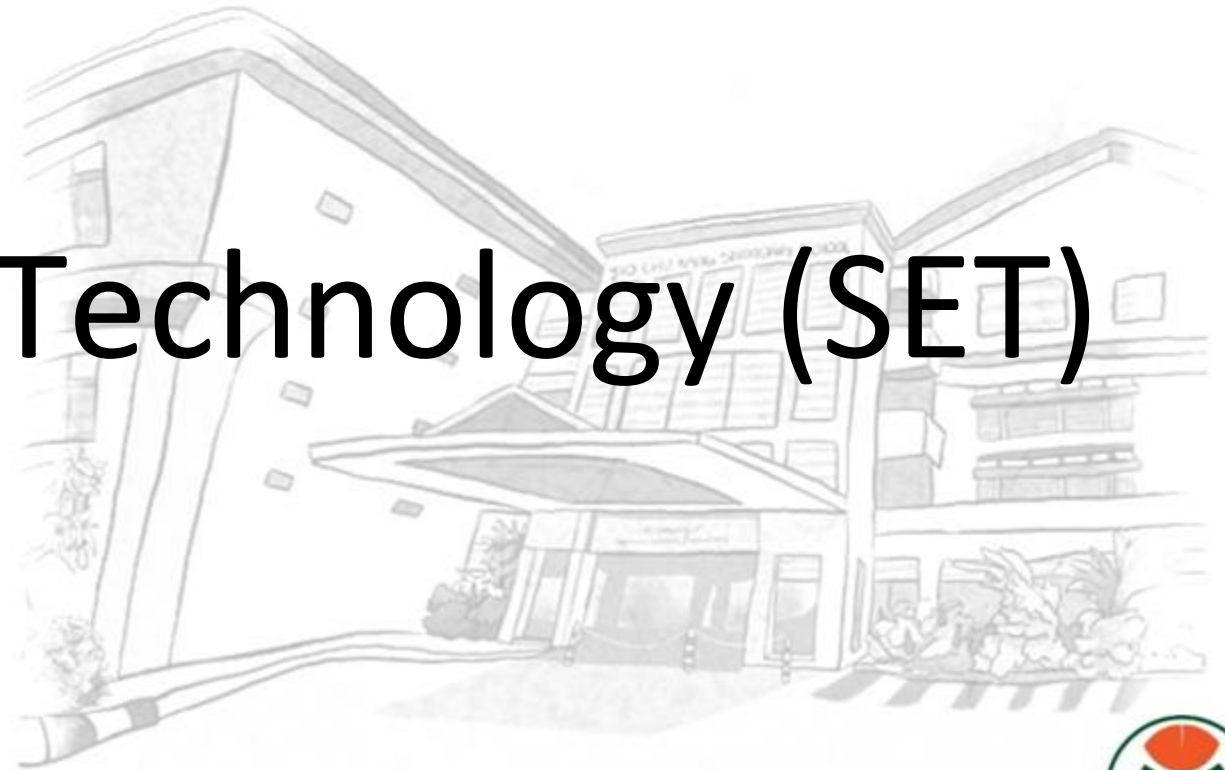
Research Chef, Baking/Culinary Technologist, Nutrition Executive, Dietician, Nutrition Educator, Food Chemist/ Laboratory Technologist, R&D Executive, Food Service and Operations Executive in Hotels, Chef etc.

*\*\* This list of courses/career prospects is non exhaustive.*





# Smart Electrical Technology (SET)



Official (Closed) / Non-Sensitive

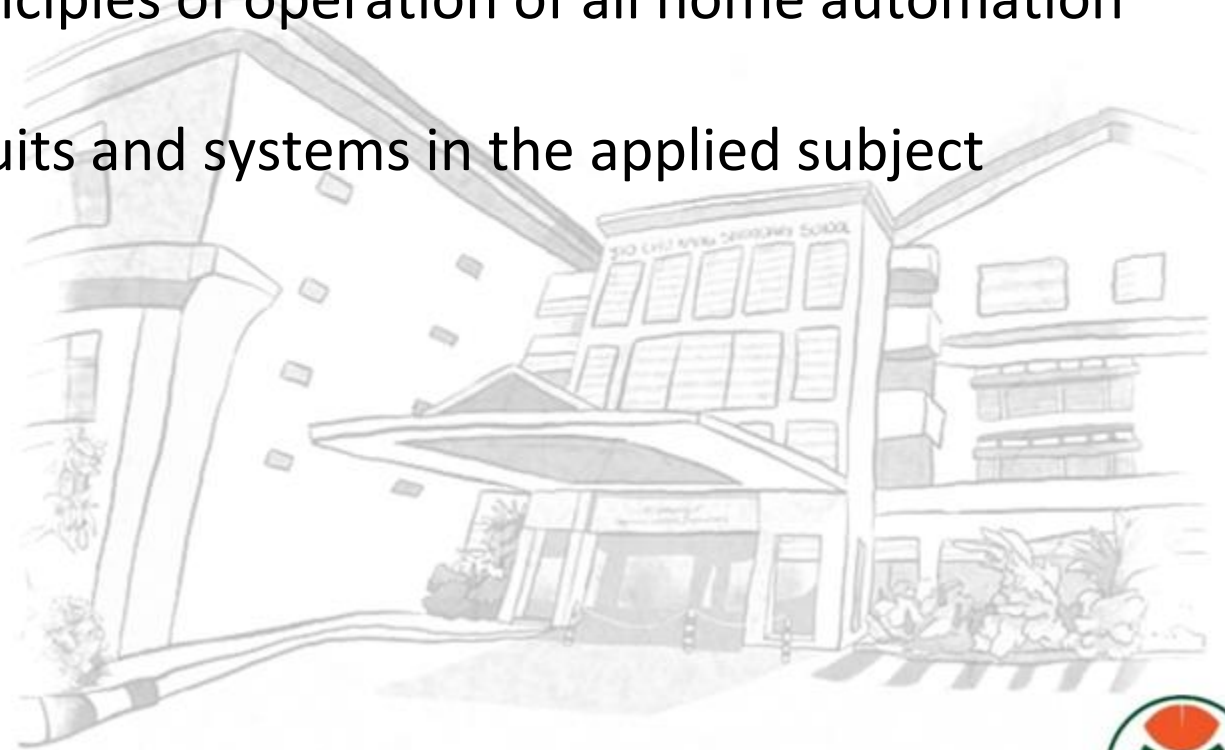


# SET – Curriculum Objectives

Students are expected to develop understanding in:

- **Subject Content:**

- Core, foundational concepts and principles of operation of all home automation systems
- Foundation training in electrical circuits and systems in the applied subject



# SET – Curriculum Objectives

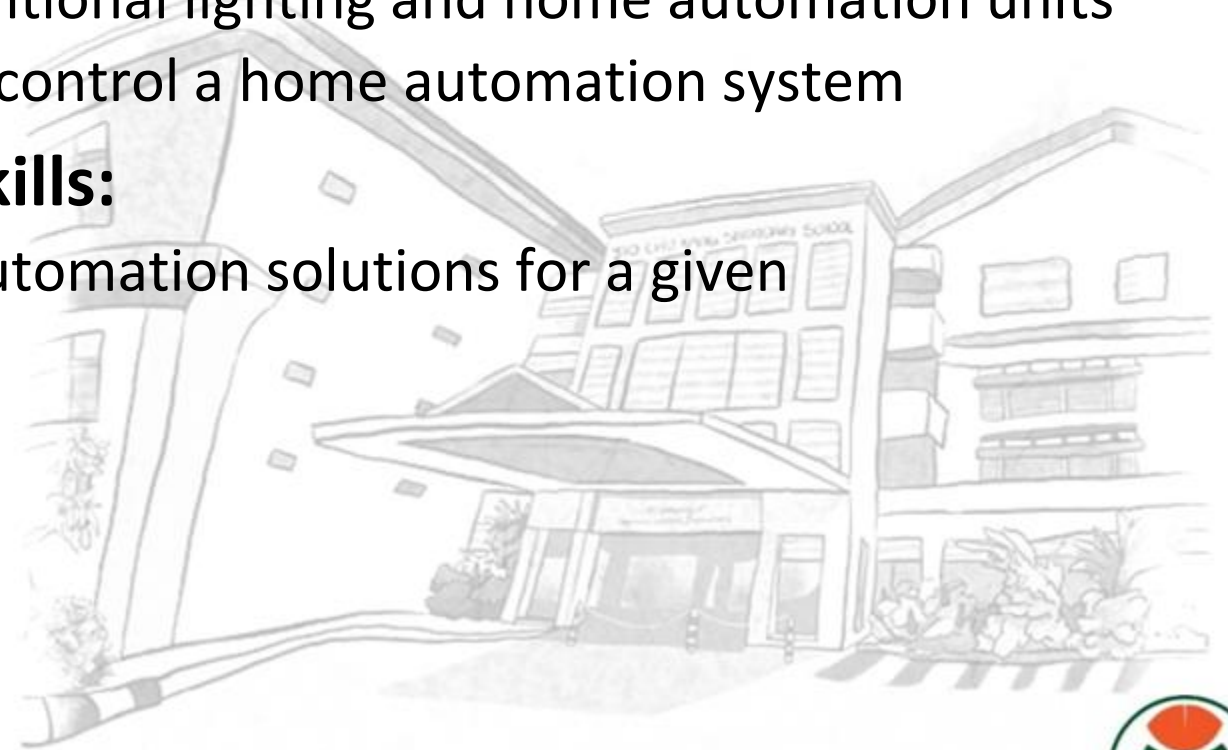
Students are expected to develop understanding in:

- **Practical Skills:**

- Hands-on practical training in conventional lighting and home automation units
- Use of smartphones to manage and control a home automation system

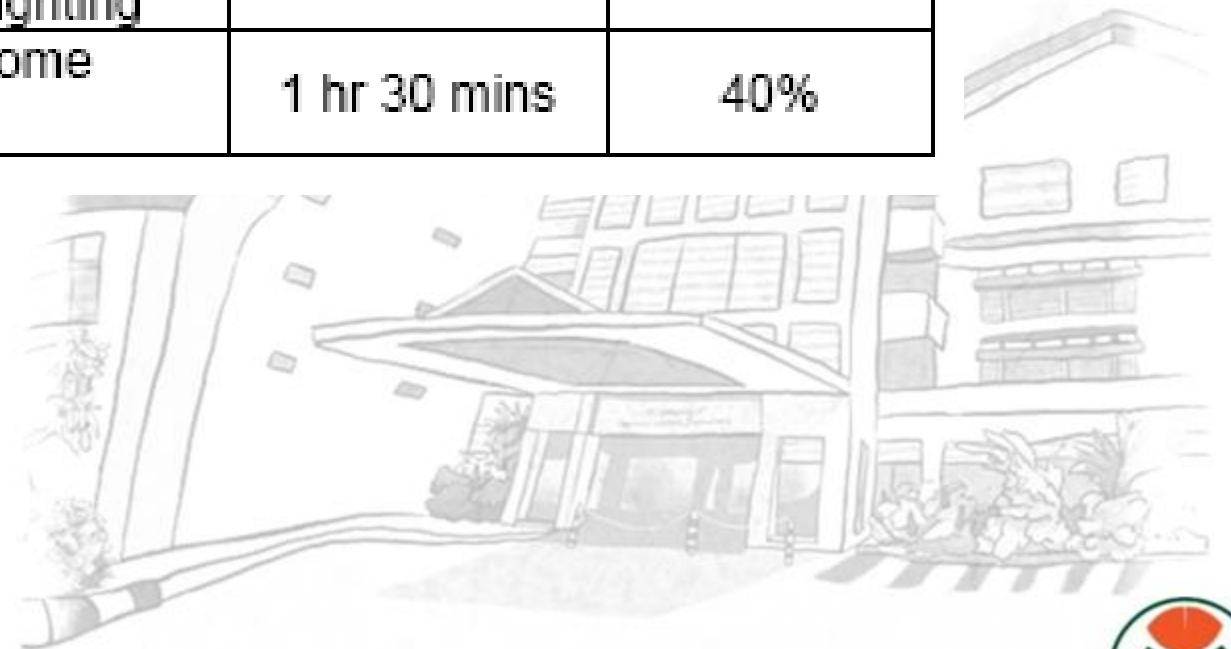
- **Analytical and Problem-Solving Skills:**

- Design, implement and test home automation solutions for a given requirement/application



# SET – Assessment

Paper	Mode	Duration	Weighting
1	Written Examination	1 hr	30%
2	Practical Examination - Electrical Principles & Conventional Lighting	1 hr 20 mins	30%
3	Practical Examination - Home Automation	1 hr 30 mins	40%



# SET – Curriculum Objectives

- MOE-ITE Applied Subject
- Can be used to replace Science for admission to Nitec courses in ITE.
- Currently, only **9** schools in Singapore are offering this subject.





# Post-Secondary & Career Options

Institutions**	Courses**
ITE/ Polytechnics	Electrical, Control and Computer Engineering or related fields

- **Career Prospects**

- Electrical Engineer, Programmer, Facility Management Engineer etc.

- -an expert in installing, maintaining, operating, troubleshooting electrical installations, control circuits, electrical equipment and systems in domestic premises, commercial buildings and industrial plants.

*Graduates who have acquired two years of relevant experience in the work performed by a licensed electrical worker would be eligible to apply to Energy Market Authority (EMA) to sit for the test leading to the award of an Electrician Licence issued by EMA.*

*\*\*This list of courses/career prospects is non exhaustive.*



# Support for Students (2023)

- **Structured Remedial Programme/ 1-1 Consultation**

Lower Sec & Sec 3:

Upon request and arrangements with Subject Teachers

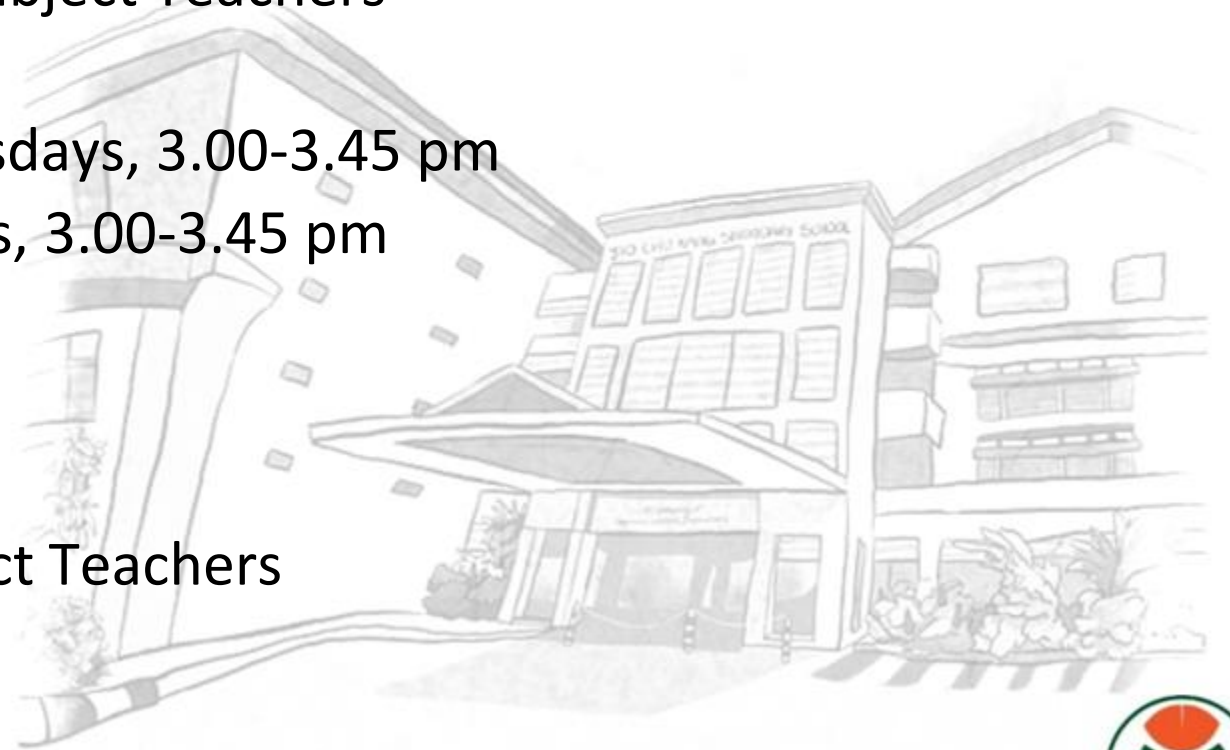
Sec 4E/5N: Odd Tuesdays/ Even Wednesdays, 3.00-3.45 pm

Sec 4N: Odd & Even Tuesdays/Thursdays, 3.00-3.45 pm

(to check students' own schedule)

- **June Holidays**

4E/N(A)/N(T): Arrangements with Subject Teachers



# Learning Experiences for Students

Art	Design & Technology/ ALP	Food & Nutrition
Learning Journeys to: National Art Gallery and/or Art Exhibitions	Expose to coding through interactive and hands-on in Emerging Technologies via ALP  Partner with NYP: Cardboard Modelling	Consumer Association Singapore (CASE) Assembly Talk & Exhibition
Showcase/School E.g. <i>yckss_artists</i>	Create a prototype Eg. <i>Design Challenge,</i> <i>F.I.T.A. Project</i> <i>(a multi-disciplinary project)</i>	Culinary Competition Eg. <i>yiocancook</i>



# F.I.T.A. PROJECT: PROBLEM STATEMENTS IN REAL-WORLD CONTEXT ★

## TOWARDS SUSTAINABILITY

### Task 1 : Creating renewable energy resources

Identify a location in school where you can generate electricity from renewable resources, eg water, wind, solar, plants to offset our carbon footprints.



### Task 2 : Keeping our classrooms cool!\*2023\*

Create a prototype classroom to include features that would keep classrooms cool eg. explore cool paints, add greenery etc.

### Task 3 : Survival camping kit

Create a survival camping kit to include a device tapping on natural resources as an energy source.





# DESIGN-THINKING

## EMPATHIZE



FITA\_2E3\_Group8 ☆ Saving...

File Edit View Insert Format Slide Arrange Tools Add-ons Help Last edit was...

43

44

45

46

47

48

**TASK 1 (EMPATHIZE)**

Observe users and their behaviour in the context of their lives	Interact and interview users	Experience what your user experiences
<p>What features are available in school that can be used as a renewable energy and how easily can students access them?</p>	<p>Ask your classmates what are some of the things they would do if electrical energy is not available.</p>	<p>Which of the ideas(from column 2) you think would be useful for your class and why?</p>
<p>Sunlight, water.</p> <p>Water can be easily accessed by the students by using the water cooler/tap/and any other water sources that can be found in school, and we can collect rainwater on rainy days</p>	<p>Use candle as a light source since lights cannot turn on.</p> <p>Find some resources such as wood to make a fire as a light source</p> <p>Use kinetic energy from our steps to convert to electrical energy</p>	<p>Getting more electrical energy and store it in batteries(solar panels with increased surface areas to capture more sunlight to convert to more electrical energy,more than enough to use for our daily activities(light,fan,aircon, etc) and use remainder to put into a battery. So that when electrical energy is not available,we can use the batteries]</p>
<p>Sunlight can be easily accessed by the students in the morning and the afternoon when there is more sunlight.</p>	<p>Get more electrical energy and store it in batteries</p>	

Click to add speaker notes



# DESIGN-THINKING IDEATE & PROTOTYPE



**Do It Yourself Air Conditioner**  
Using evaporative cooling

So basically,

- the fan will blow high volume and low pressure air into the container
- the fast moving air will help fasten the rate of evaporation
- as it carries away water vapour, essentially drying the air, which leads to increased evaporation rates
- When evaporation occurs, heat is taken from the water that remains in the liquid state, resulting in a cooler liquid

So when water evaporates, it becomes water vapour, the water vapour will then flow through the tiny holes, increasing the water vapour in the air. Making it more humid and creates more comfort for people in the room.  
It is more like a humidifier

- IDEA #3 AIR DIY AC USING EVAPORATIVE COOLING**
- Step 1: take a plastic container, draw a rectangle on the cover and cut it out with a pen knife
  - Step 2: Place the computer fan on top and glue it with a glue gun
  - Step 3: Use a soldering iron and make about 24 holes on the front side of the container
  - Step 4: take three sponges and place them in water or freeze it (for a better effect)
  - Step 5: use a pair of pliers and pluck out the wire insulation and connect the stripped wire with the alligator clip which is connected to a battery switch
  - Step 6: Turn the fan on and enjoy!



Task 2 prototypes

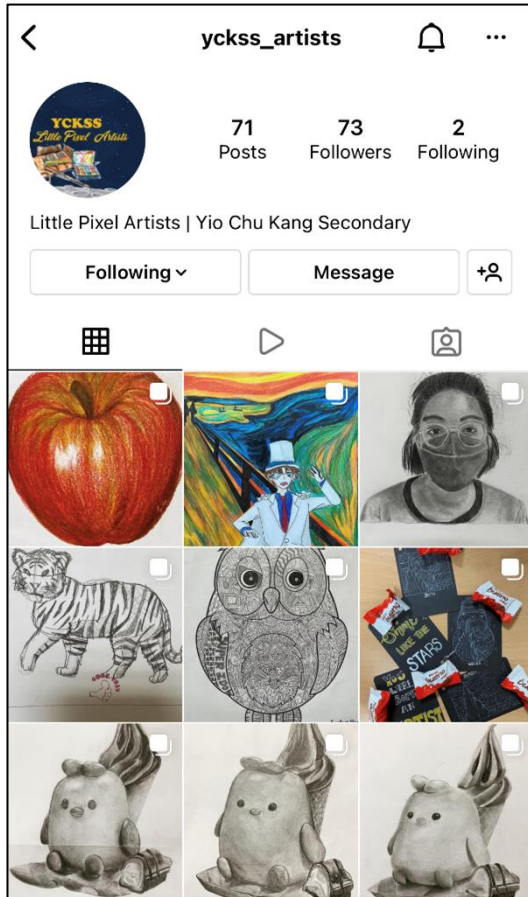


FEEDBACK ON YOUR DESIGN IDEAS			
Ideas	Positive Points	Negative Points	Feedback
Idea #1 Charlene's DIY AC	Very effective at cooling, does not use a lot of energy, a good substitute for a air conditioner	Not as energy efficient as it requires electricity from fossil fuels to power the fan and requires a lot of ice cubes as it will eventually melt again	I think that it is a good idea as it is easy to make and helps cool the surroundings, however a different source of energy to power the fan would be more viable.
Idea #2 Sami DIY plant holder	Very eco friendly (using recycled plastic bottles), does not require energy from any source (except for the Sun), also helps cool the class down, also helps make the class look more alive and colourful-with flowers, does not require a lot of materials, easy to	May attract bugs, Can cause the environment to be more warm and humid, may need constant care-need to water and trim leaves, may require a lot of manpower to make it (as we need a lot of it)	I think that the idea is great, it is eco friendly and has a lot of benefits. However the cost of the plants could be expensive and may attract bugs. But good effort, your research is well done, using the concept of transpiration is very innovative



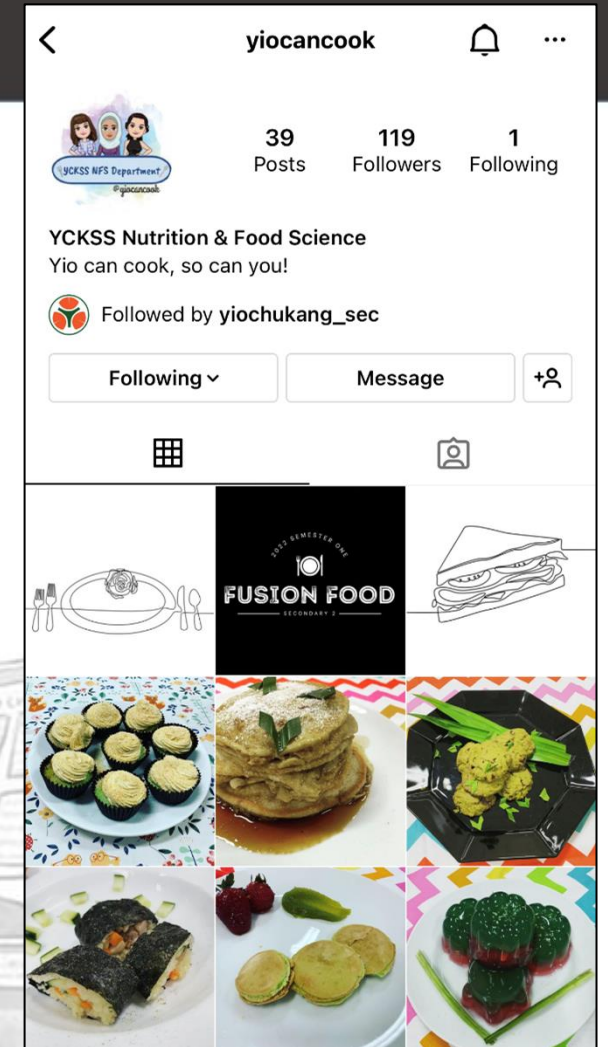


# Caring Innovators



473 views

yoloyio D&T Engineering Challenge: Marble Run! - During the last Full Home-Based Learning, our Secondary 1 Design & Technology (D&T) students were given an Engineering Challenge – Marble Run (adapted from the James Dyson Foundation), to get them excited about learning at home. They were tasked to keep a marble "running" for at least 20 seconds by constructing a structure using cardboard boxes and struts.



# Use of Technology

Art	Design & Technology (D&T)	Nutrition & Food Science (NFS)	Smart Electrical Technology (SET)
<p>Lesson: Student Learning Space (SLS) Assignments: Google Suites, Google Classroom &amp; Google Sites</p>			
Sketchbook App (Sketching)	Showbie App  Sketchbook App (Sketching)	Padlet App	Showbie App



# ***Thank you for your kind attention!***

**For more information, please contact**

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