



St. Antonius Girls' College 聖安當女書院

FROM HYDROPONIC CULTIVATION STEAM  
PROGRAMME TO THE BUSINESS WORLD  
從水耕種植 STEAM 計劃走進商業世界



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(STEAM Coordinator STEAM 統籌主任)

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# Introduction 介紹



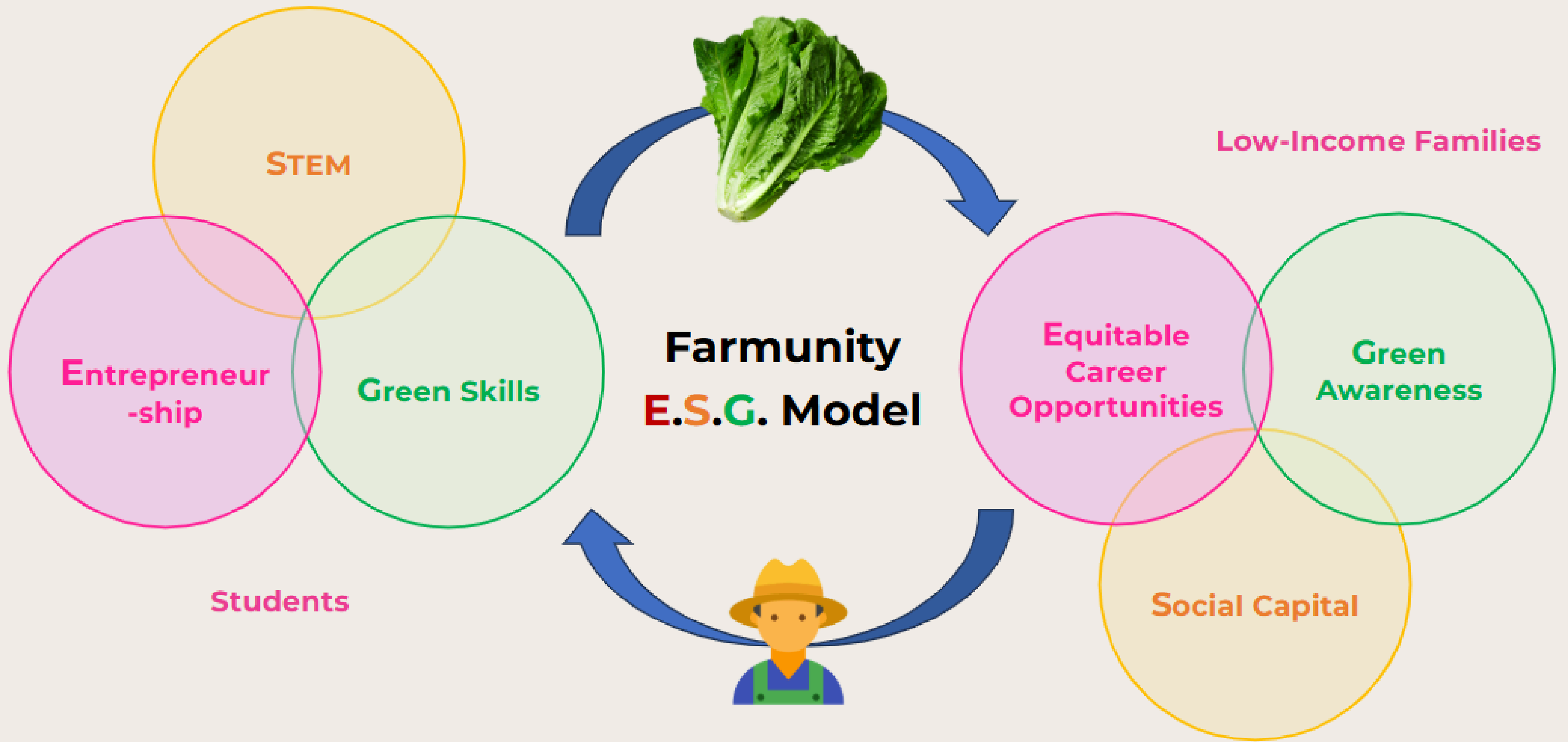
# ST. ANTONIUS GIRLS' COLLEGE 聖安當女書院

- Catholic Girls' School 天主教女校
  - Located in Yau Tong (Kwun Tong District) 位於油塘(觀塘區)
  - STEAM Classes for S1 and S2 students 中一及中二級設有 STEAM 課堂
    - 4 lessons per cycle 每循環週四堂
    - Project-based Lessons 項目主導課堂
    - S1: Sports Science、S2: Application of AI and Hydroponic Cultivation  
中一：運動科學、中二：AI 的應用及水耕種植
- 

# BACKGROUND OF FARMUNITY

## 「水耕苗社」的背景

- Theme 主題: Farm + Community 耕作 + 社區
- Sharing farming outcomes with the community 向社區分享農業成果
- Partnership with local green tech company Farmacy HK  
與本地綠色科技公司水耕細作合作
- Promote a new E.S.G. idea 提倡新 E.S.G. 想法
  - Entrepreneurship, STEAM and Green Skills  
創業精神、STEAM 及綠色技能



# BACKGROUND OF FARMUNITY

## 「水耕苗社」的背景

- Expect to run for 5 years  
期望可運行五年
  - First 2 years, Farmacy HK will provide support  
首兩年 Farmacy HK 提供支援
  - The remaining 3 years will be operated by the school itself  
餘下三年由學校自行營運

# BACKGROUND OF FARMUNITY

## 「水耕苗社」的背景

- Every month we need to donate a certain amount of veggies to charity  
每月需捐贈一定數目的蔬菜作慈善用途
- Involve more than 100 students each year  
每年需涉及多於 100 名學生
- 60 hours of training on growing and marketing  
60 小時種植以及銷售訓練

# TIMELINE 時間線



# SNAPSHOT OF FARM LAB 智慧農場 (WITHOUT VEGGIES)



# SNAPSHOT OF FARM LAB 智慧農場 (WITH VEGGIES)





# ABOUT FARM LAB 關於智慧農場

- 6 growth racks and 1 seedling rack  
6 組生長櫃以及 1 組培苗櫃
  - Can grow around 2500 veggies every month  
每月產量可達 2500 棵蔬菜
  - Lighting and water cycling can be controlled and monitored through a mobile app  
燈光及水循環系統可透過手機程式控制及監視
  - Real-time temperature and humidity  
實時溫度及濕度
- 

# ABOUT FARM LAB 關於智慧農場

- Currently growing 目前種植中：

- Romaine Lettuce 羅馬生菜
- Oak leaf lettuce 橡葉生菜
- Bok Choy 白菜
- Mint 薄荷
- Parsley 番茜
- Basil 羅勒
- Thyme 百里香
- etc...

} Vegetables 菜

} Herbs 香料



# Implementation 實踐

# WHY IMC APPROVED? 為何 IMC 批准?

- Promote interdisciplinary learning 推動跨領域學習
  - More than 10 subjects and groups are willing to participate 超過 10 個學科及組別願意參與
- Reasonable expenses with the support of various funding 於不同資金支援下支出數目合理
  - Educational Programme 教育課程: \$48,800/year
  - Monthly Maintenance 每月維修: \$13,500/month




# WHY IMC APPROVED? 為何 IMC 批准?

- Most important:

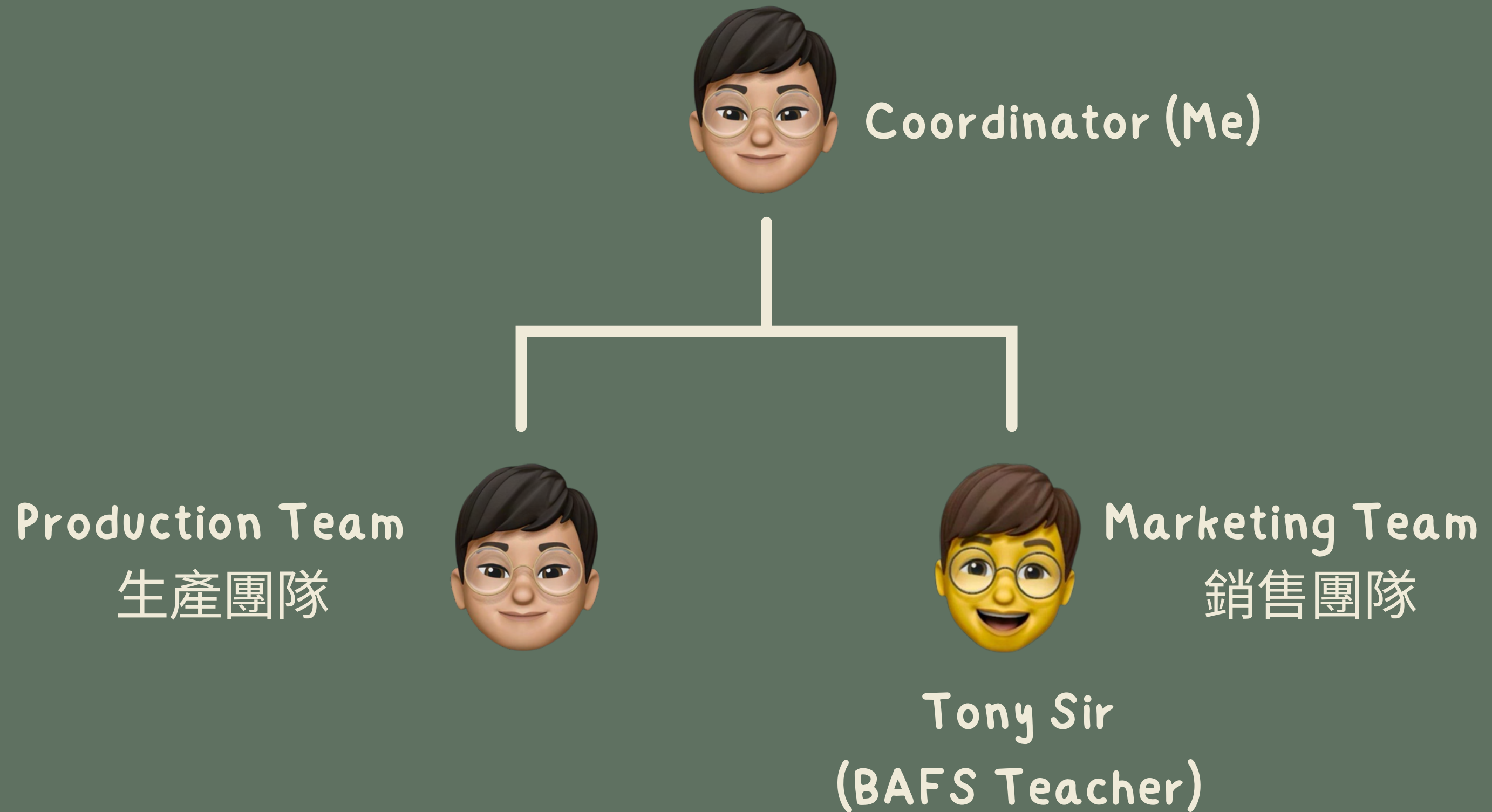
A valuable opportunity for students in business-related subjects to become entrepreneurs

為商業相關科目的學生提供了一個寶貴的機會，讓他們成為企業家



# ESTABLISHMENT OF THE FARMUNITY GROUP

## FARMUNITY 小組的成立



# PRODUCTION TEAM 生產團隊

- Consists of 3 STEAM teachers, 1 Assistant Teacher, 2 core students and 16 members  
包括 3 名 STEAM 科老師、1 名助理教師、2 名核心同學及 24 名組員
- Responsible for the entire process from seedling cultivation, transplanting, to harvesting and packaging  
負責由育苗、移苗至收成及包裝整個工序
- Disinfection and cleaning of machines  
機器消毒及清潔
- Adjust the quantity of veggies according to business needs  
根據業務需求調整蔬菜的數量

# PRODUCTION TEAM 生產團隊



# PRODUCTION TEAM 生產團隊





# MARKETING TEAM 銷售團隊

- Consists of 1 BAFS teacher, 2 core students and 8 members  
包括1名 BAFS 科老師、2 名核心同學及 8 名組員
- Responsible for post-harvest follow-up work  
負責收成後的跟進工作
- Running the social media Instagram account  
營運社交媒體 Instagram 帳號
- Designing the logo for products and packaging  
設計產品標誌及包裝
- Market research on hydroponic veggies  
展開對水耕蔬菜的市場研究



# MARKETING TEAM 銷售團隊

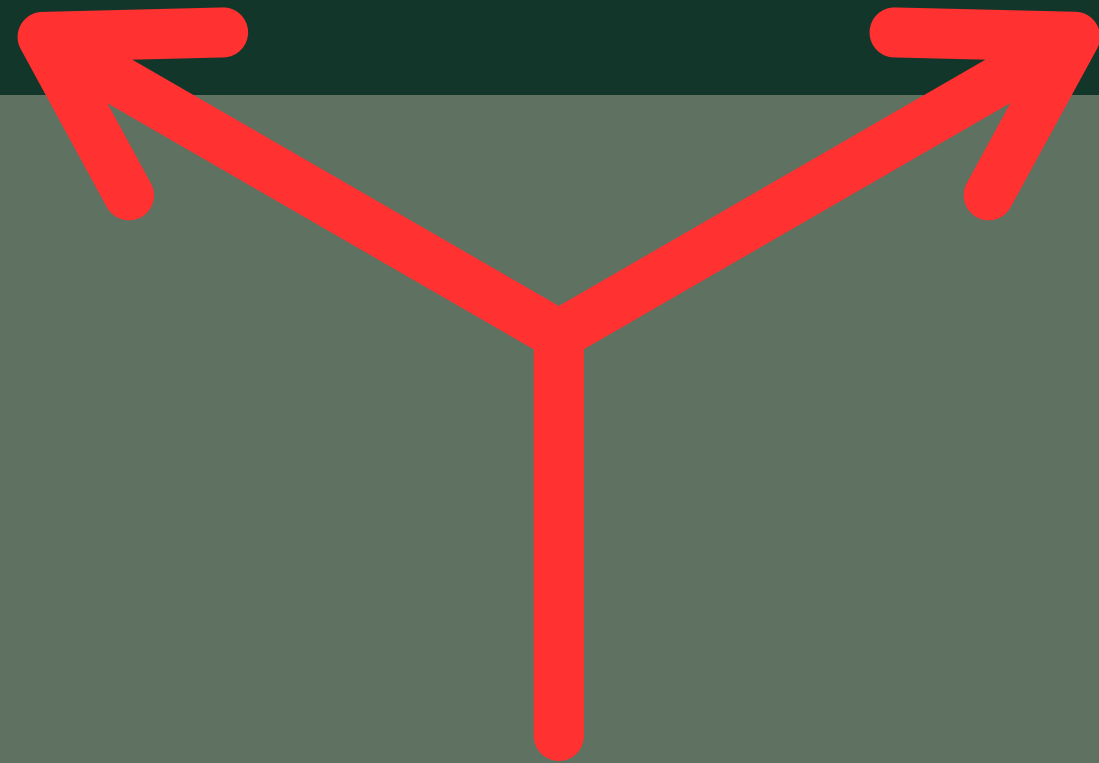


# RTHK INTERVIEW 香港電台採訪



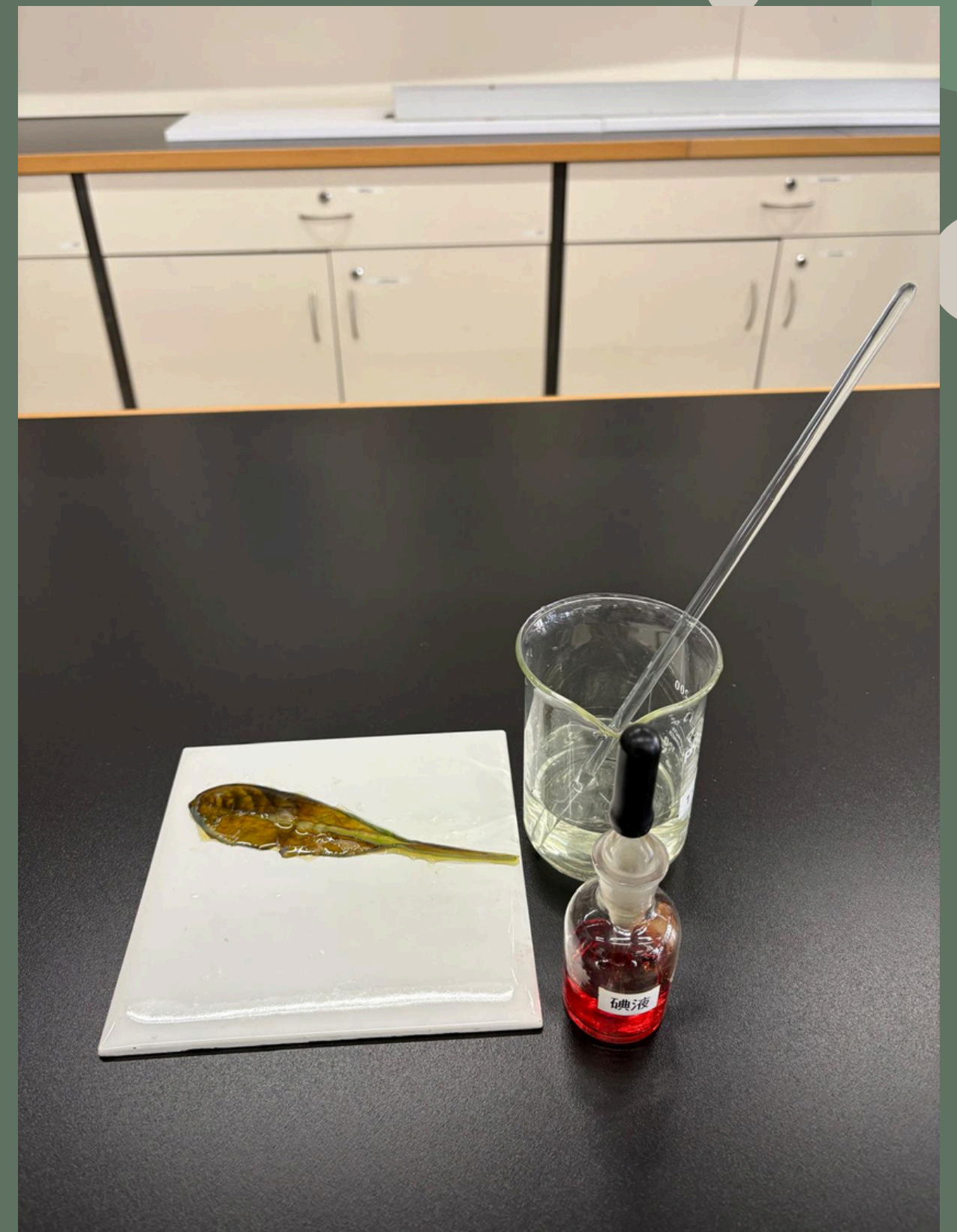
# STEAM Element STEAM 元素

STEAM Element STEAM 元素



# PHOTOSYNTHESIS 光合作用

- Integrated Science S2 topic  
綜合科學科中二科課題
- Provide an easy way for Integrated Science to collect green leaves  
為綜合科學科提供更簡單渠道取得綠葉



# KEY ELEMENTS FOR PLANTS 植物關鍵元素

- Nitrogen 氮
  - Manufactures chlorophyll in leaves 製造葉片中的葉綠素
- Phosphorus 磷
  - Promotes root development 促進根系發展
- Potassium 鉀
  - Enhances plant resistance to adversity and extend shelf life  
增強植物抵抗逆境, 延長保存期限

# HOW PH VALUE AFFECT PLANTS PH 值如何影響植物

- Too acidic 過酸
  - Leaves are turning red 葉轉成紅色
- How to solve it? 如何解決?
  - Add lime powder 加入石灰粉



STEAM Element STEAM 元素

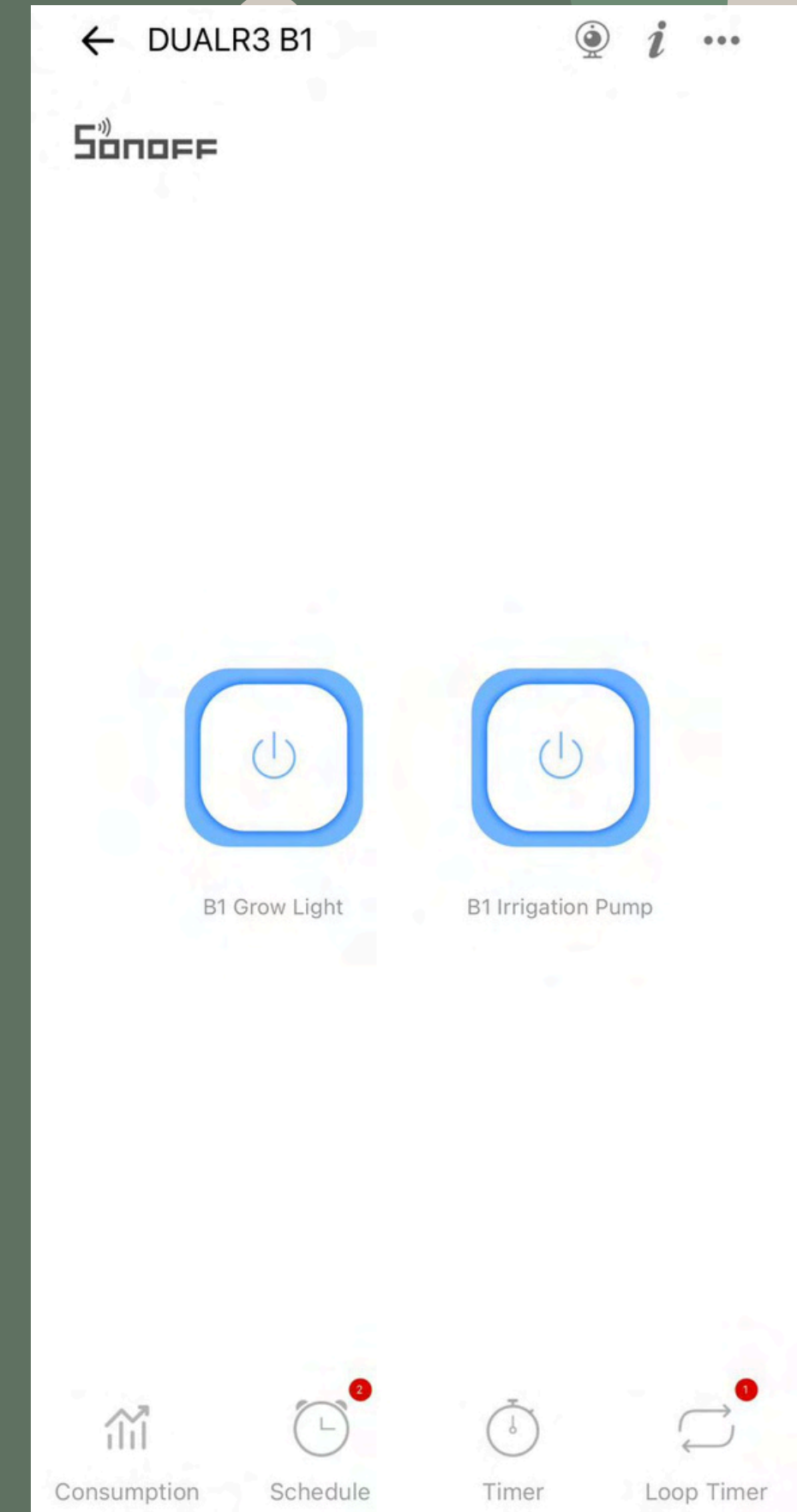
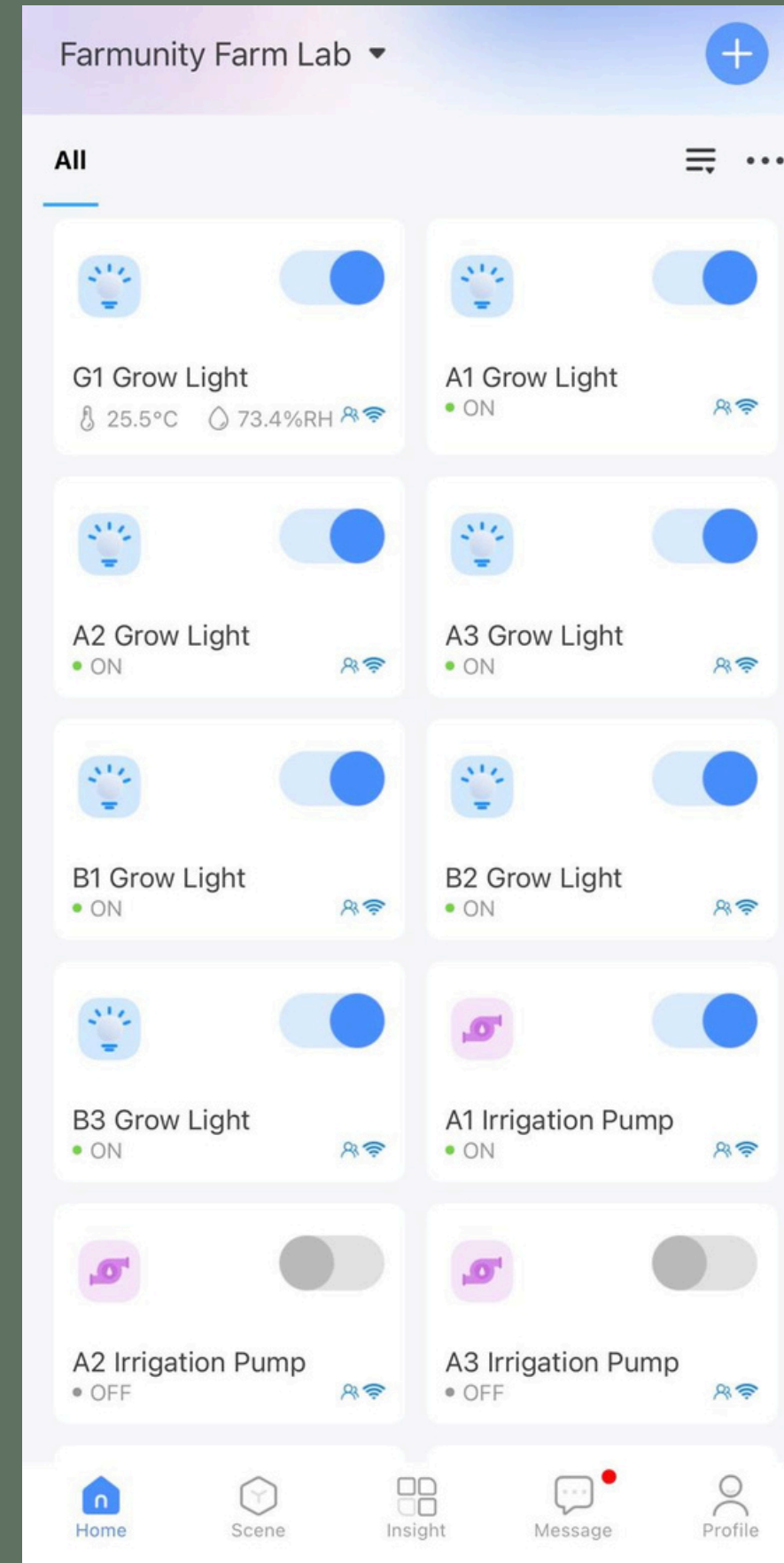


# APPLICATION OF IOT 物聯網的應用

- Environmental Monitoring 環境監測
  - Monitor temperature and humidity in real-time  
實時監測溫度及濕度
- Automated Systems 自動化系統
  - Switch on/off the dehumidifier according to humidity  
因應濕度自動開關抽濕機
  - Regularly switch on/off the water pump and oxygen pump  
定期開關水泵及氧氣泵

# INTERFACE OF APP 程式用戶介面

- Permission is only granted to teachers and core students from the production team  
權限僅限於老師以及生產團隊的核心同學
- Main functions 主要功用:
  - Schedule 定期
  - Loop Timer 循環時間



# USE OF AI 人工智能的應用

- Analysis the reason for failing to grow healthy herbs  
分析無法種出健康香料的原因

為什麼圖中的葉轉紅色了



11:06 AM ✓

Assistant

植物的葉子轉紅色可能有幾個原因：

1. **光照**：植物在強光下可能會產生更多的紅色葉綠素，這是植物適應環境的一種方式。
2. **養分不足**：缺乏某些養分，如氮，可能會導致葉子顏色變化。
3. **溫度變化**：低溫環境會促使某些植物葉子變紅。
4. **壓力反應**：如水分不足或病蟲害，植物可能會通過改變顏色來適應壓力。

這些因素可能會導致植物的葉子顏色變化，具體情況需要根據植物的品種和生長環境進一步分析。

11:06 AM

不是溫度及壓力問題，還有什麼原因？

11:07 AM ✓

Assistant

除了溫度和壓力，葉子轉紅色的其他原因可能包括：

1. **光譜**：如果植物接受的光譜主要是紅光或藍光，可能會促進紅色素的生成。
2. **生長階段**：某些植物在特定生長階段（如開花前）可能會自然而然地變紅。
3. **抗氧化劑增加**：植物可能在應對環境中的壓力（如紫外線或病害）時增加紅色素，這有助於保護葉子。
4. **水管理**：雖然你提到水分不是問題，但水分的變化在某些情況下仍可能影響顏色，例如過度或不足的水分會改變植物的營養吸收。

這些因素可能會影響植物顏色的變化。進一步觀察植物的生長環境和條件可能會提供更多線索。

11:07 AM

# USE OF AI 人工智能的應用

- Proofread the text introduction for Instagram post and provide translation 校對 Instagram 帖的文字簡介以及提供翻譯



farmunityhk and 2 others

farmunityhk 🌱 從農場走到社區！❤️  
參與Farmunity水耕苗社學生們於智能農場的所種植的蔬菜有第一次收成了！部分更已捐贈給食物銀行樂餉社 @feedinghk，以支持有需要的社區人士及家庭。❤️

計劃不僅培植了新鮮農產品，也讓學生們學會了同理心、責任感及社關愛區意識。我們一起努力，從每一顆蔬菜開始，一步步改變世界！🌱🌟

🌱 From Farm to Community! ❤️  
We're delighted to share that vegetables grown by our students at the Farmunity Smart Farm Labs were donated to Food Bank, Feeding Hong Kong, supporting families & individuals in need. ❤️

This initiative is part of our mission to cultivate not only fresh produce but also compassion, responsibility, and a sense of community in our students. Together, we're making a difference little by little with one vegetable at a time! 🌱🌟

#FarmunityHK #FeedingHongKong #樂餉社 #食物銀行#智能農業 #社會影響 #可持續發展 #綠色技能 #foodbank #SmartFarming #SocialImpact #Sustainability #greenservice

Edited · 22w See translation

❤️ 💬 📌

👤 Liked by 2\_17leeeeeee and 100 others  
January 14

😊 Add a comment... Post

# USE OF AI 人工智能的應用

- Create logo for the Farmunity programme (Leonardo AI)  
製作 Farmunity 計劃的標誌 (Leonardo AI)



# USE OF AI 人工智能的應用

## • Create teaching materials 創作教學材料 (by Grok)

I'm creating a math problem regarding hydroponic electrical systems. The question should provide 5 sets of data and ask the student to plot the graph. Please provide the question in English and Traditional Chinese.

Below is a math problem related to hydroponic electrical systems, including 5 sets of data and a request for students to plot a graph. The problem is presented in both English and Traditional Chinese, as requested. Since you previously asked for a similar problem, I've created a new dataset and slightly varied the context to focus on pump power consumption instead of lighting, ensuring variety while meeting your requirements.

### English Version

#### Math Problem: Hydroponic Pump Power Consumption

In a hydroponic system, the power consumption of the water pump is measured at five different nutrient solution flow rates. The data below shows the flow rate (in liters per hour, L/h) and the corresponding power consumption (in watts, W) of the pump.

#### Data:

- Flow rate: 15 L/h, Power consumption: 120 W
- Flow rate: 25 L/h, Power consumption: 140 W
- Flow rate: 35 L/h, Power consumption: 155 W
- Flow rate: 45 L/h, Power consumption: 170 W
- Flow rate: 55 L/h, Power consumption: 180 W

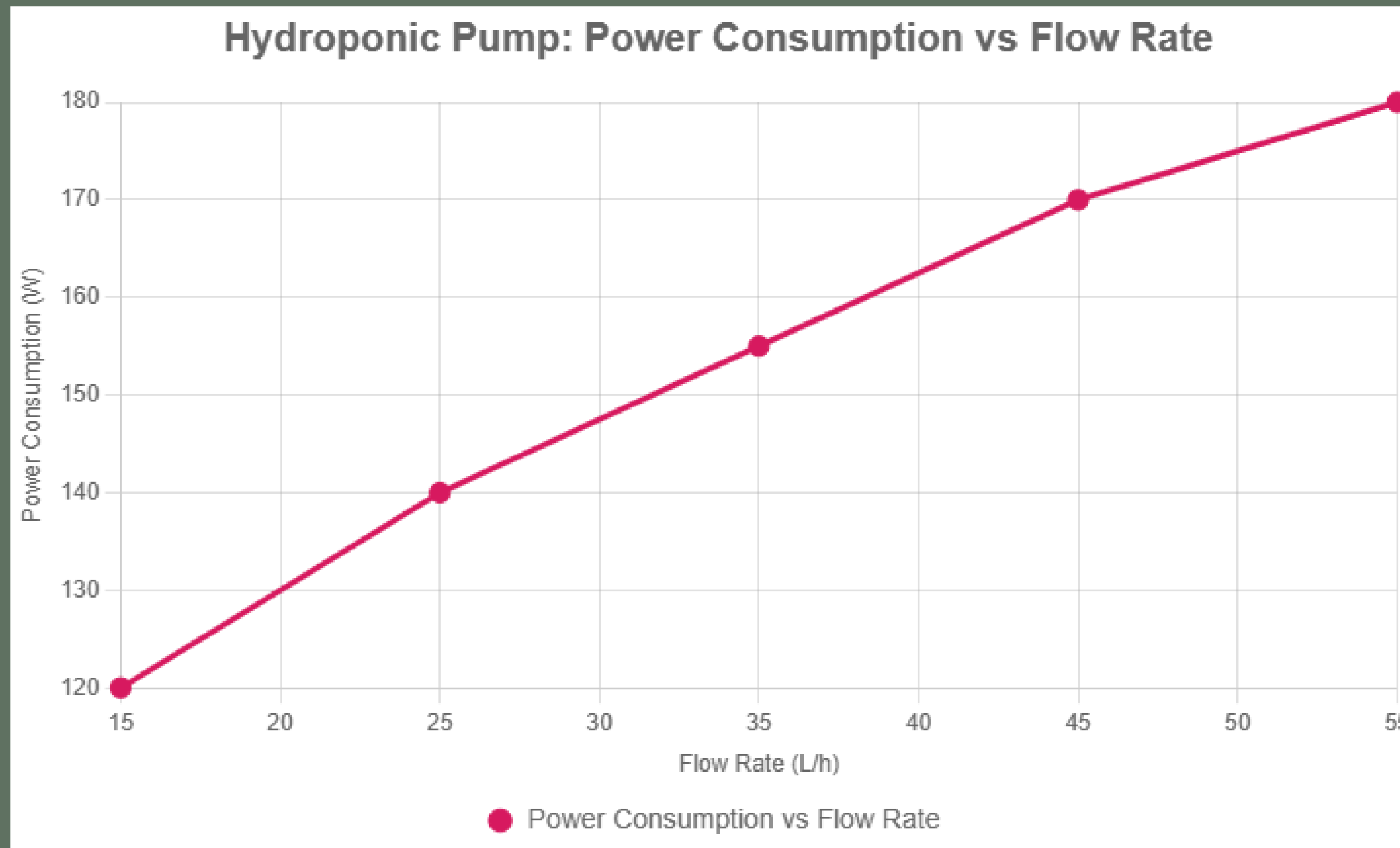
#### Task:

1. Plot a scatter graph with the flow rate (L/h) on the x-axis and power consumption (W) on the y-axis.
2. Label the axes and provide a title for the graph.
3. Based on the graph, describe the relationship between the flow rate and power consumption.

**Note:** Use a scatter plot to represent the data points and connect them with a line to show the trend.

# USE OF AI 人工智能的應用

- Create teaching materials 創作教學材料





# Business Aspect 商業方面



# EXPENSES 支出


- Monthly Maintenance Fees 每月維修費用：\$13,500
  - Annual Educational Programme Fees 每年教學課程費用：\$48,800
  - Extra Fees 額外費用：
    - Food Safety Test 食品安全測試：  
Approximately \$1,750 per species of veggies  
每款蔬菜約 \$1,750
- 



BUT 但是


WHAT DO WE WANNA ACHIEVE?

我們想要實現甚麼？





# GOALS 目標

- In the initial stage, we hope to minimize the school's expenses  
在初步階段，我們希望盡量減少學校的支出
  - Gradually achieve a balanced budget  
逐漸達致收支平衡
  - In the long run, we hope to earn profits and truly operate a business  
長遠地，希望賺取盈利並真正營運一門生意
- 



# TASTE OF ENTREPRENEURSHIP 創業的體驗

- Set up a booth during Parents' Day 家長日設置攤位
- Location 位置: Main entrance of the school 學校正門
- Target Audiences 目標對象: Parents 父母




# TASTE OF ENTREPRENEURSHIP 創業的體驗





# TASTE OF ENTREPRENEURSHIP 創業的體驗


- Reflection from the Marketing Team 銷售團隊的回饋：
    - Great target audiences and location  
好的目標對象以及選址
    - Packages are presentable and clean  
包裝可示人及整潔
    - Correct estimation of the number of veggies to be sold  
正確估計需要出售的蔬菜數目
- 

# PACKAGING 包裝





# TASTE OF ENTREPRENEURSHIP 創業的體驗

- Reflection from the Marketing Team 銷售團隊的回饋：
    - A unified statement is needed when dealing with bargaining  
在處理講價時，需要有統一的說法
    - Persuasion skills still need improvement  
游說技巧仍需加強
    - An exhausting experience, but a great sense of achievement  
令人疲憊的經歷，但很大的成就感
- 

# TASTE OF ENTREPRENEURSHIP 創業的體驗


- Profit 盈利:
  - \$20 for 1 pack x 40 = \$800
  - \$25 for 2 packs x 5 = \$125
  - \$30 for 2 packs x 12 = \$360
- Total income 總收入: \$1,285

Not bad for our 1st business trial !!





# TASTE OF ENTREPRENEURSHIP 創業的體驗

- Set up a booth during Charity Day 慈善日設置攤位
  - Location 位置: Cover Playground 有蓋操場
  - Target Audiences 目標對象: Students and Teachers 學生及老師
- 

# TASTE OF ENTREPRENEURSHIP 創業的體驗



# TASTE OF ENTREPRENEURSHIP 創業的體驗


- Reflection from the Marketing Team 銷售團隊的回饋：
  - Sell salad instead of whole packs of veggies  
以沙律取代整袋蔬菜出售
  - Poor timing and target audiences  
差的時間段以及目標對象
    - After lunch, everyone is already full  
午膳後時間，每人都已經飽肚
  - Nothing is always ideal 沒有什麼是永遠理想的

# TASTE OF ENTREPRENEURSHIP 創業的體驗

- Profit 盈利:
  - \$20 for 30 sets = \$600
  - Donated \$250 to Volunteering Team  
捐贈 \$250 予義工組
- Total income 總收入: \$350



# TASTE OF ENTREPRENEURSHIP 創業的體驗


- Set up a booth with Farmacy HK during HKU Alumni Day  
聯同 Farmacy HK 於港大校友日設置攤位
  - Location 位置: HKU Main Building 香港大學本部大樓
  - Target Audiences 目標對象: Parents with kids nearby 有孩子在附近的父母
- 

# TASTE OF ENTREPRENEURSHIP 創業的體驗





# TASTE OF ENTREPRENEURSHIP 創業的體驗

- Reflection from the Marketing Team 銷售團隊的回饋：
    - Veggies need to be sold ASAP due to the weather  
蔬菜因為天氣原因需要儘快出售
    - It was a bad choice to sell veggies on the occasion  
在這種情況下出售蔬菜是一個錯的選擇
    - Only preparing 7 Bok Choy was a wise decision  
只準備了 7 棵白菜是明智的決定
- 



# TASTE OF ENTREPRENEURSHIP 創業的體驗

- Profit 盈利:
  - \$20 for 7 Bok Choy = \$140
- Total income 總收入: \$140



# 1ST ROUND SUMMARY 第一階段總結

- After three events, we earned \$1,775 in total  
三次活動後，我們共賺取合共 \$1,775
- Reduced the school expenses - DONE!  
減少學校支出 - 完成!


But, can we go further?

但是，我們可以走得更前嗎？



# INITIATE NEW PROGRAM 啟動新計劃

## Botanic Species Growing and Operations trial run

- By growing 10 different herbs and sending them to Agent of Change  
透過種植 10 款不同香料並寄往「加減乘除基金」
  - Earning \$13,500 monthly, which offsets maintenance fees  
每個月賺取 \$13,500，抵消每月維修費用
  - Lasting until 8/2025; uncertain about collaboration for next year  
計劃維持至 8 月尾，來年合作關係仍存在未知數
- 

# BOTANIC SPECIES GROWING AND OPERATIONS TRIAL RUN

Guess what it is?  
猜猜這是什麼?

Dill  
蒔蘿

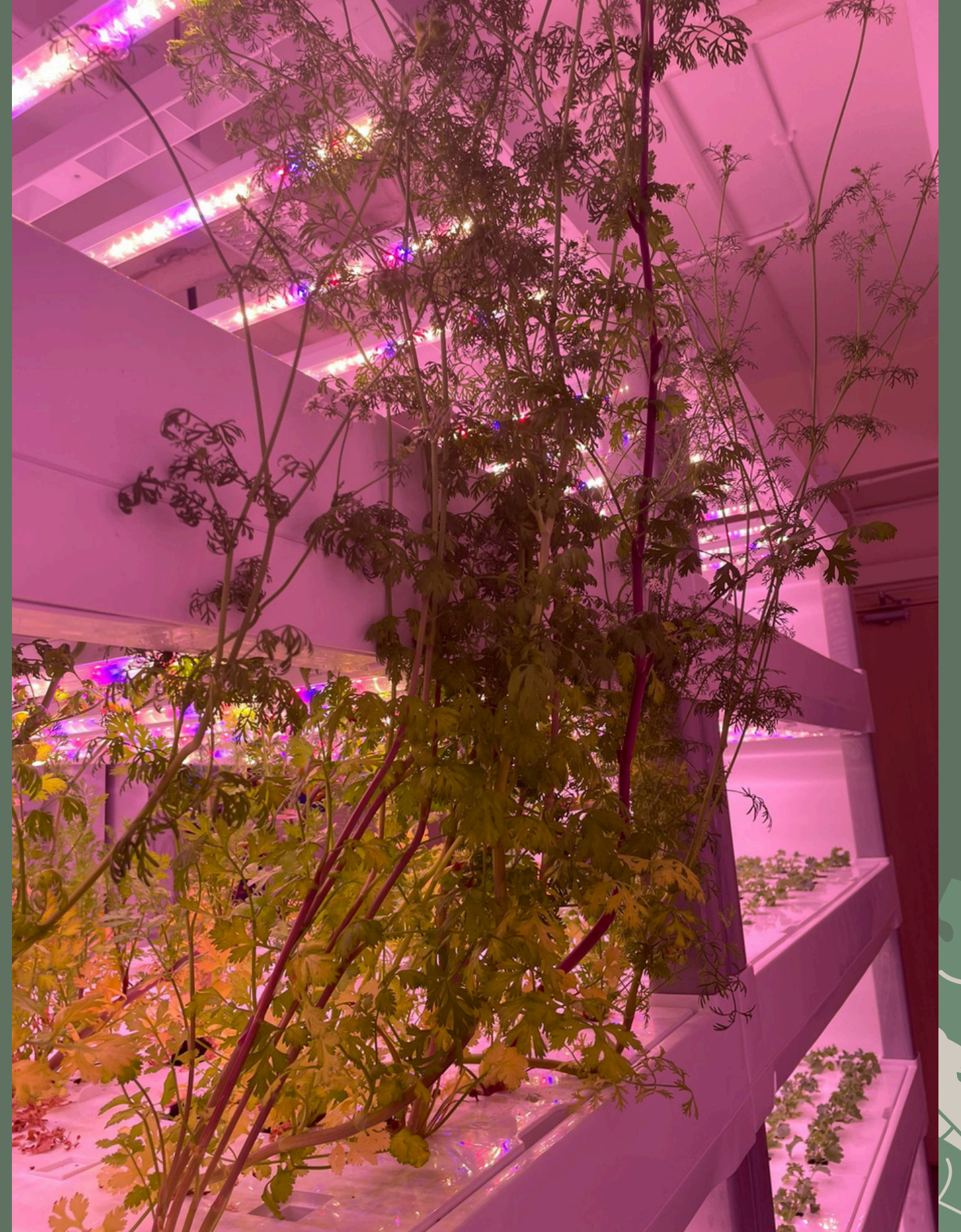


# BOTANIC SPECIES GROWING AND OPERATIONS TRIAL RUN

Guess what it is?  
猜猜這是什麼?

Coriander

芫荽



# BOTANIC SPECIES GROWING AND OPERATIONS TRIAL RUN


Guess what it is?  
猜猜這是什麼?

Thyme  
百里香





## FOLLOW-UP BY MARKETING TEAM 銷售團隊的跟進

- Design a new timetable for germination  
為種苗設計新的時間表
  - Make sure we can deliver the desired number of herbs each month  
確保每個月我們可以產出需要的香料數目
  - Provide after-sales service  
提供售後服務
  - Reallocate the number of other veggies  
重新分配其他蔬菜的數目
- 



# Future Plan 未來計劃

# CONNECT WITH LARGE ENTERPRISES 接觸大型企業

- Connecting with Marriott Group  
正接觸萬豪集團
- Met a Director of Engineering from Marriott Group during our Info Day  
學校資訊日遇見萬豪集團的工程總監
- With support from Farmacy HK, we are close to reaching an agreement  
在 Farmacy HK 幫助下接近達成協議



# CONNECT WITH SOCIAL ENTERPRISES 接觸社會企業

- Connecting with Ginkgo House  
正接觸銀杏館
- Has always maintained a close relationship with our school  
與我們學校一直有緊密聯繫
- Considering a “buy 2, get 1 free” promotion for charity purposes  
考慮「買二送一」作慈善用途

The image features a central dark green horizontal band. The top and bottom edges of the image are light cream-colored. In each of the four corners, there are stylized floral and leaf illustrations in shades of green and light pink. The text "LAST BUT NOT LEAST" is centered within the dark green band in a white, rounded, sans-serif font.

LAST BUT NOT LEAST

# MORE INFORMATION 更多資訊

Follow our Instagram page



Watch our interview with RTHK



# THANK YOU