



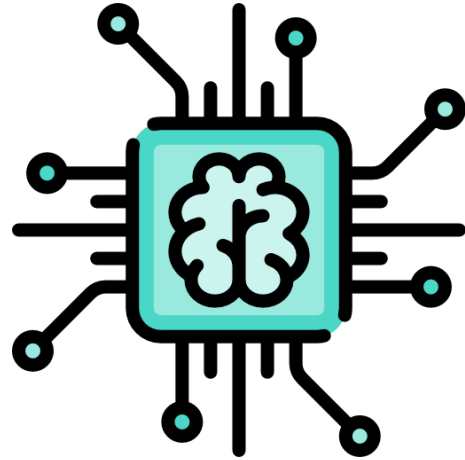
STEM Education for Life Science

#STEM #Hydroponics #Aquaponics

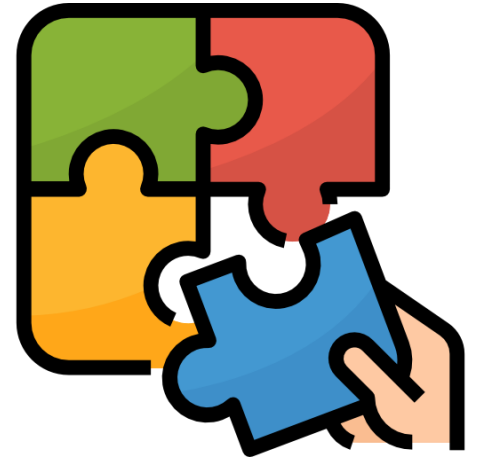


Growgreen /Key Learning

Established in 2016
Science Park



Hi-tech company



Total Solution
Systems



Experience

100+

Universities
HKAGE

Secondary Schools
Primary Schools
Kindergartens

4000+

Students

**Standard &
tailor-made**
Systems & courses



1. STEM Explorer Program



Integrate learning elements from different KLAs

Subjects involved:

General science /
Biology

- Hydroponics, plant growth



Food science

- Sensory evaluation and nutritional analysis



Chemistry

Elements for plant growth



STEM Explorer/ Maker



IT (Big data/Coding)

- IoT and mechanism behind

Physics

- Light and its effect on plant



Geography

- Food Shortage and the solution





What is hydroponic farming?

<https://www.youtube.com/watch?v=tzBK4QZSQaY>

Source: San Antonio Urban Farming

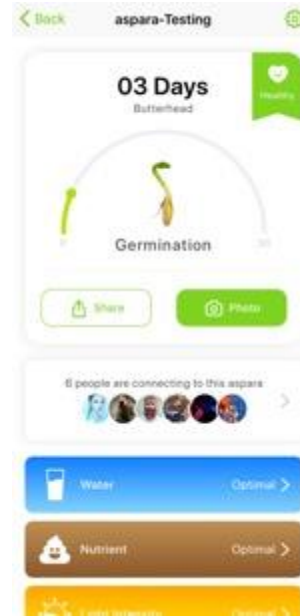


What is aspara® ?

<https://www.youtube.com/watch?v=RCe0SEz03r8>



aspara® STEM



**LED with
variable
spectrum**



**Built-in
smart sensors**



**aspara®
App & STEM
portal**



**Seed
Capsules**

Possible Explorations



Built-in Humidity Sensing

- Built-in hygrometer
- Possible experiments:
- Effect of humidity on plant growth



Controllable Light

- Variable light intensity
- Variable photo period
- Variable light spectrum

Possible experiments:

- Effect of light intensity/ photo period light spectrum length on plant growth



Controllable Water flow

- Ebb & flow system
- Variable flow interval
- Variable flow cycles in 1 interval

Possible experiments:

- Effect of water flow on plant growth



Nutrients Detection

- Nutrient content monitoring
- Possible experiments:
- Effect of nutrient concentration & composition on plant growth

Possible explorations



Hydroponic System

- Clean, will not attract bugs
- Soilless, easy to control
- Root easy to be visualized
- Easy to weight the plant

Ideal for various experiment setting



Mobile App: aspara® App

For remote monitor and control



Single portal to monitor all aspara™ registered



Remote light control



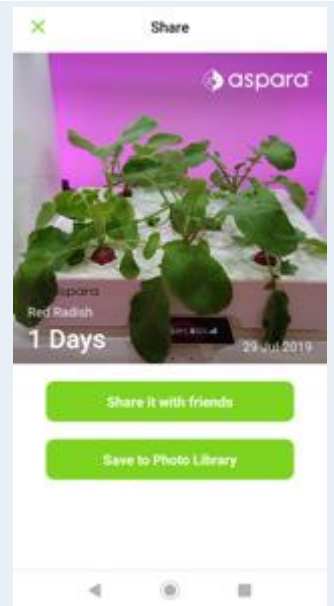
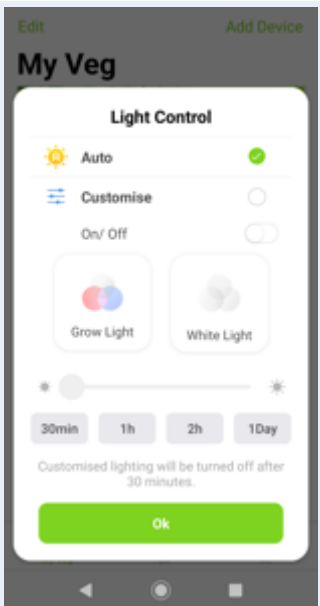
Helps to take photos and time-lapse videos



Available in App store (iOS) and Google Play (Android) for easy download

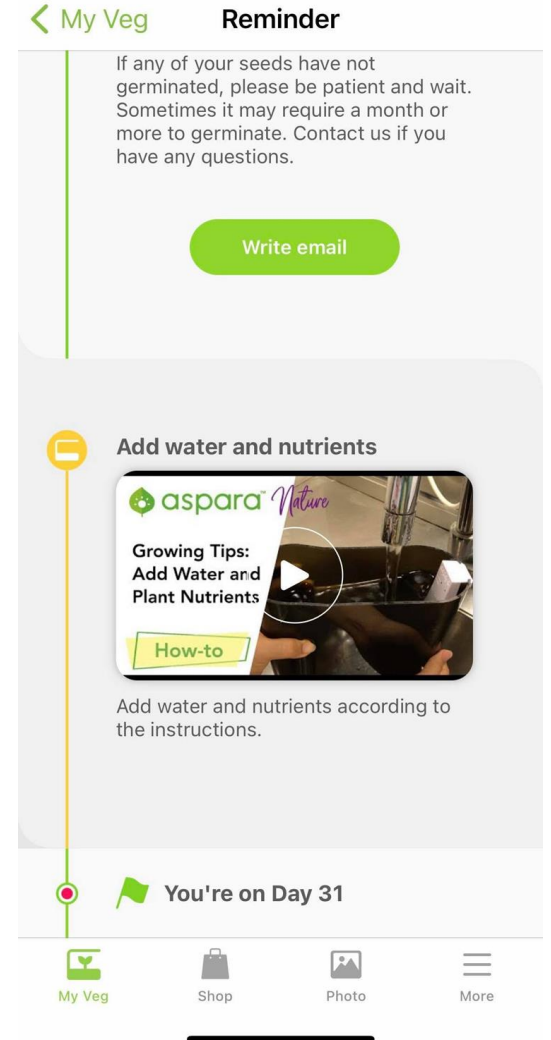
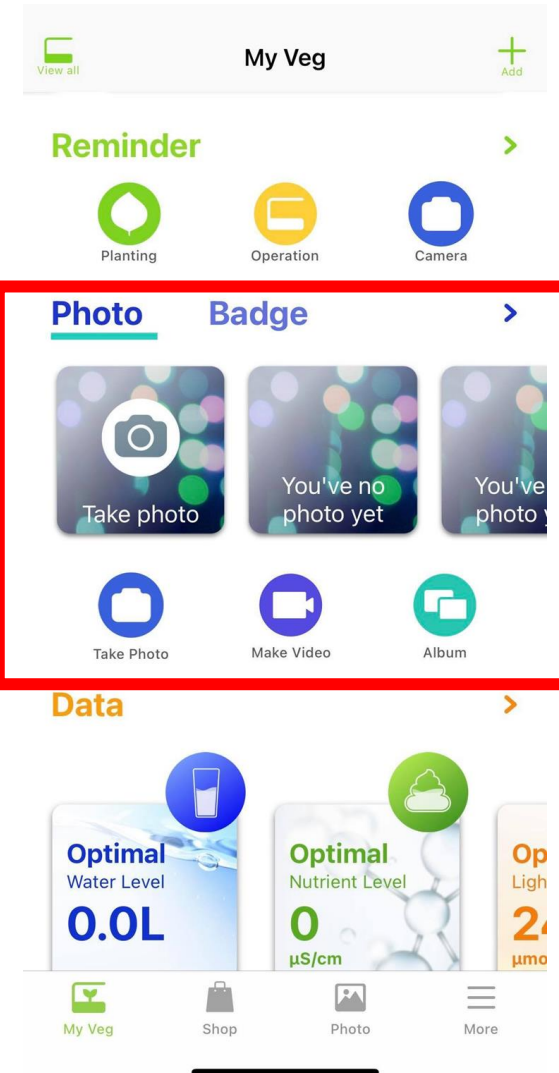
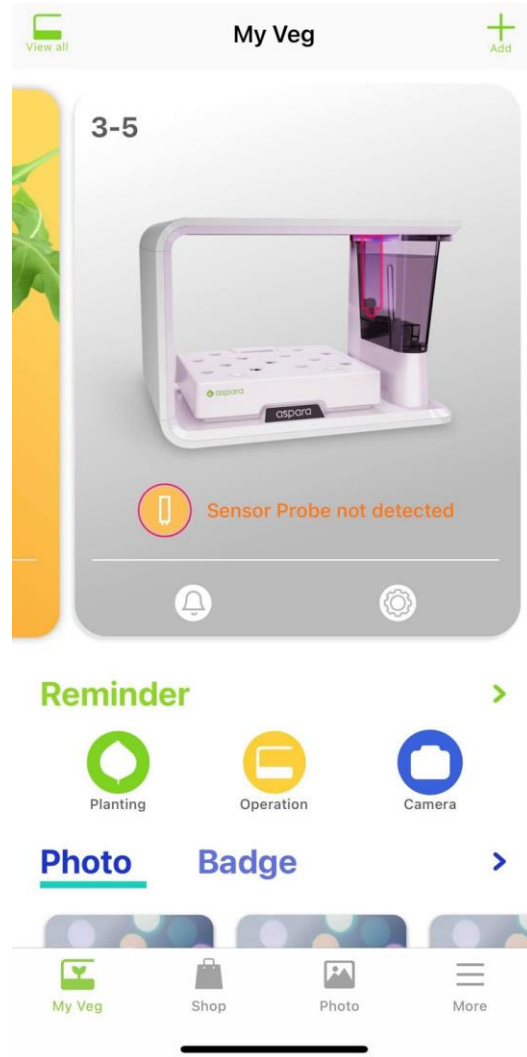
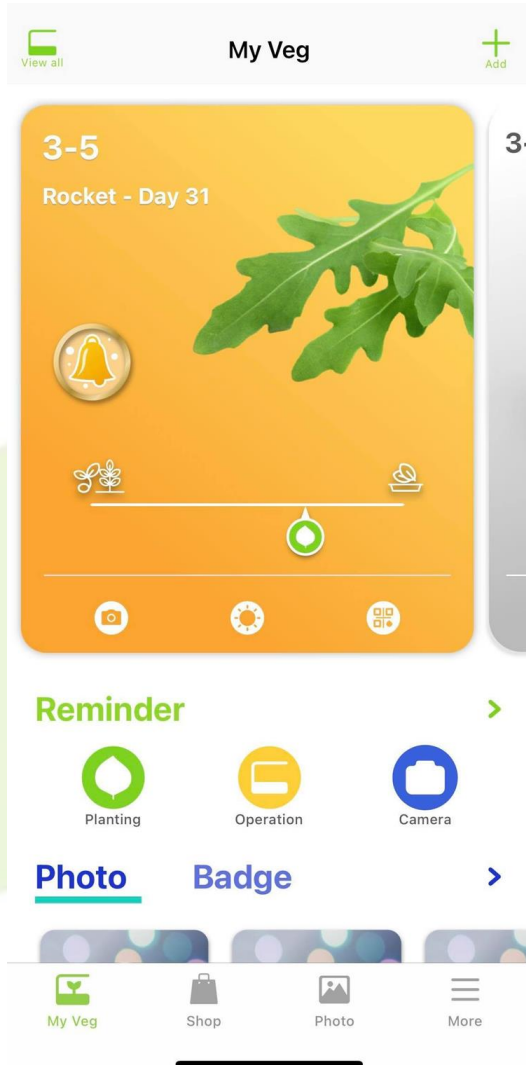


24/7 growth condition data monitoring (Data includes water level, nutrient level, light intensity, humidity, air and water temperature)





aspara® App (Tips)





Web Portal aspara® Research

Perfect supplementary tool for research and experiment



Single portal to control all aspara® registered



24/7 data monitor and export for experimental analysis
(Data includes water level, nutrient level, light intensity, humidity, air and water temperature)



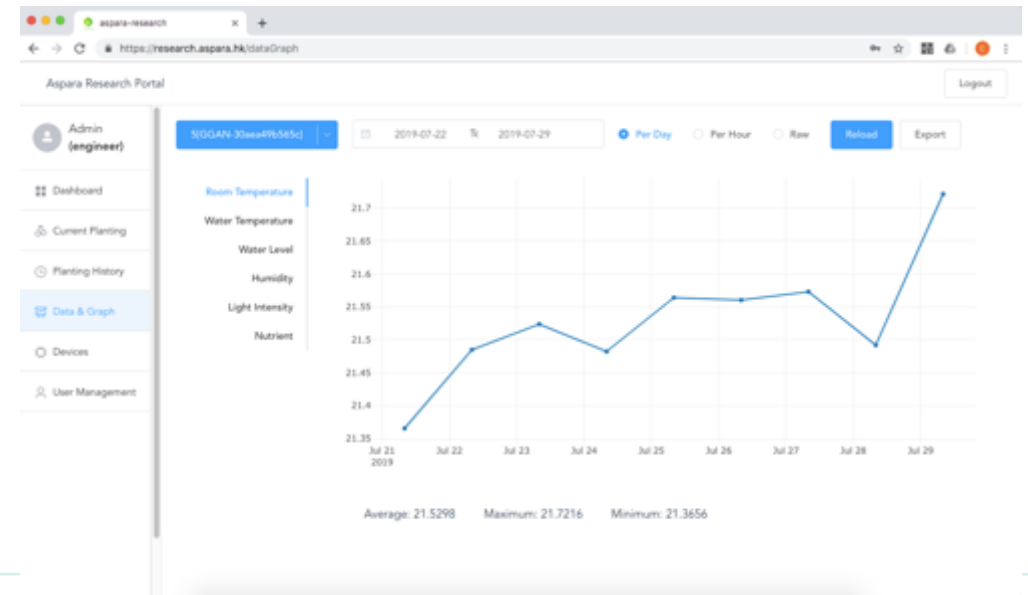
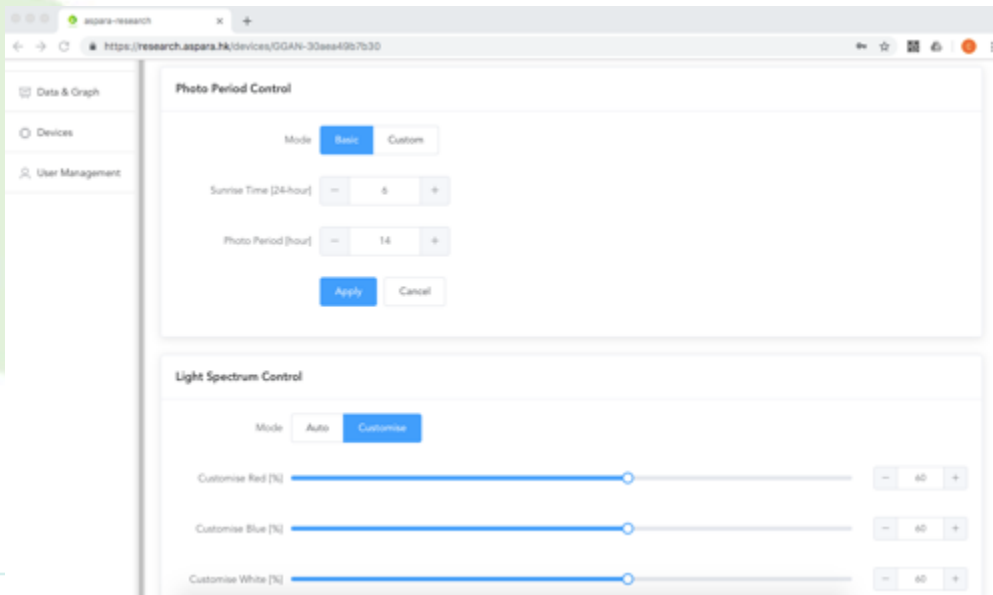
Free water flow control



Free light spectrum and intensity control



Free photo period control





Seed Kit

Easy and Quick

Start growing by filling your **aspara** with the seed capsules of your choice, add water, and turn it on.



Fresh and Safe

Our seeds are non-GMO and/or organic[^]. Enjoy fresh, clean and healthy-to-eat vegetables in just 28 days*.

[^] Selected seeds
* Vary from seed to seed



Wide Variety of Fruits & Veg Growth

100%
biodegradable &
environmentally friendly

Organic
free from herbicides, pesticides,
fertilisers and chemicals

Non-GMO*
• Only for selected seeds





University & Schools



Hong Kong Polytechnic University



Leung Shek Chee College



Malvern College Hong Kong

Suggested topics

1. Seed germination
2. Modern farming method with IoT solution
3. Plant nutrient
4. pH & plants
5. Light and plants
6. Data processing and presentation



< Showcase in HKCEC

Tseung Kwan O
Government Secondary School >



R & D center in Science Park





Thank you