

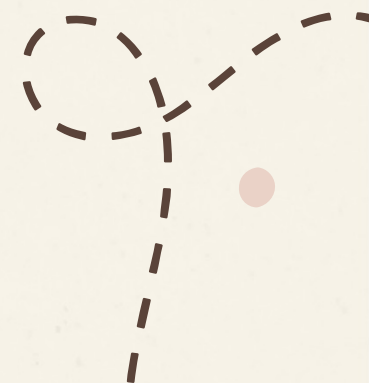
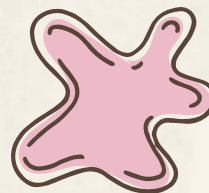


**e-Learning Development Laboratory**  
Department of Electrical and Electronic Engineering  
The University of Hong Kong

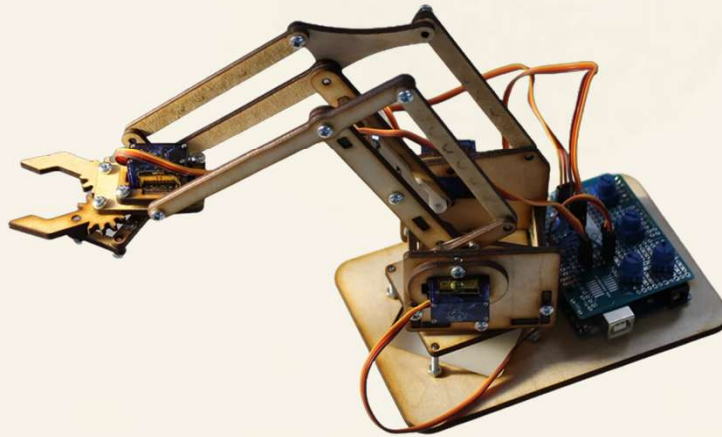
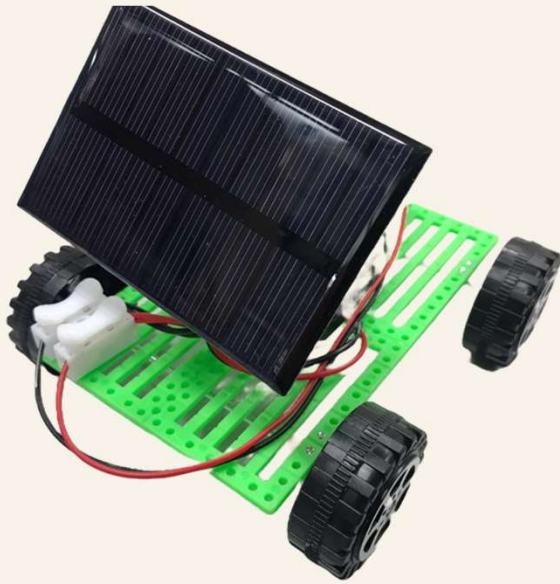
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# 自主學習 STEAM教育 支援計劃成果分享

Alice Ma  
Kelvin Chun



# STEAM



```
▶ #@title 5. Run
print (source)
Device = "cuda" #@param ["cuda", "cpu"]

Processor = "face_swapper face_enhancer" #@param ["face_swapper face_
VideoEncoder = "libx264" #@param ["libx264", "libx265","ibvpx-vp9"]

VideoQuality = "18" #@param {type:"string"}

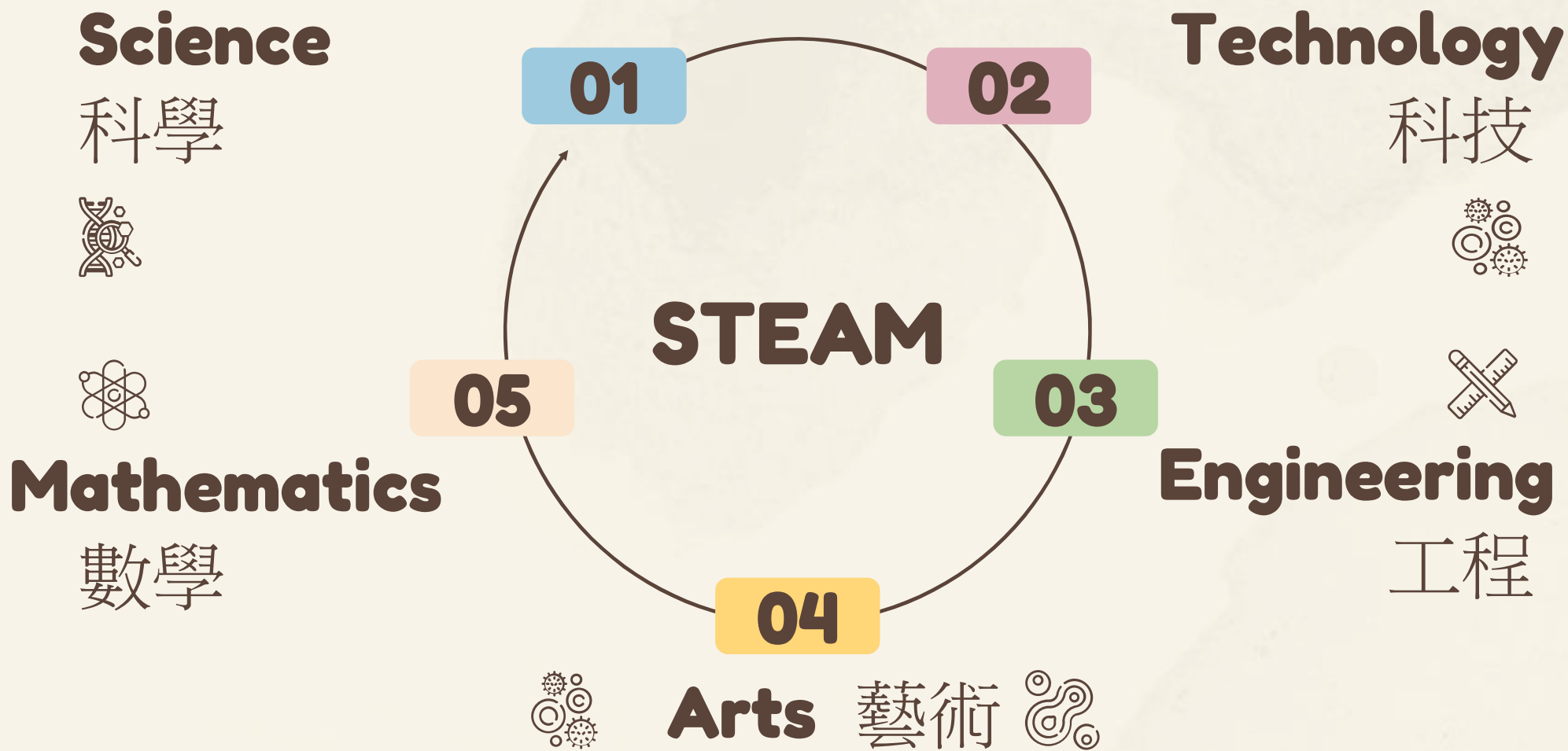
KeepFPS = True #@param {type:"boolean"}
KeepAudio = True #@param {type:"boolean"}
KeepFrames = False #@param {type:"boolean"}
ManyFaces = True #@param {type:"boolean"}

KeepFPS = "--keep-fps" if KeepFPS==True else ""
KeepAudio = "--skip-audio" if KeepAudio==True else ""
KeepFrames = "--keep-frames" if KeepFrames==True else ""
ManyFaces = "--many-faces" if ManyFaces==True else ""

#new
#cmd = f"run.py --execution-provider {Device} --source {source} -t {t

#old
cmd = f"run.py --execution-provider {Device} --source {source} -t {t
print("cmd:"+cmd)
!python $cmd
```

# STEAM Education



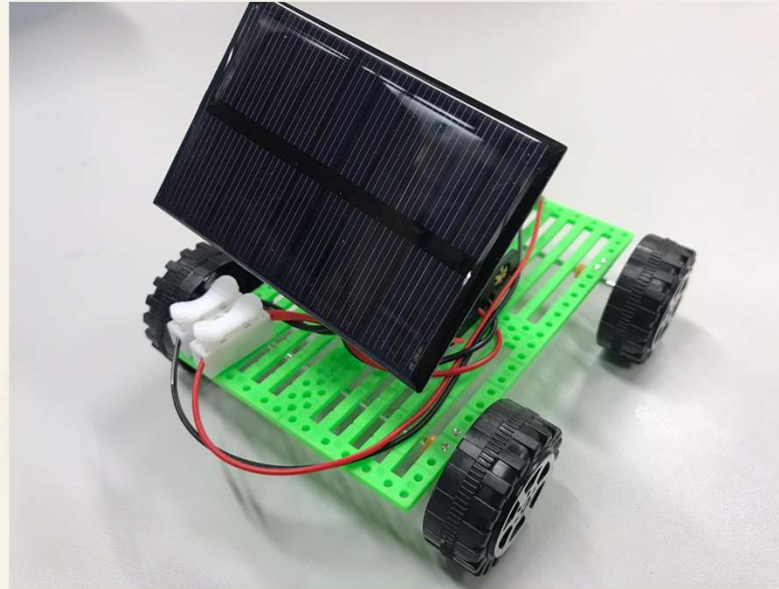
## 科學 S

認識不同角度與太陽板輸出VI的關係、串聯及並聯

## 數學 M

調較太陽能板角度、量度行車距離、時間

# 太陽能小車



## 藝術 A

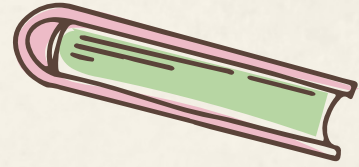
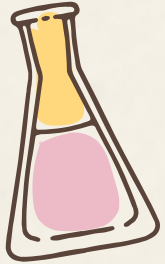
利用不同物料及色彩配搭美化小車

## 科技 T

利用太陽能推動馬達，產生動力，令車子能向前進

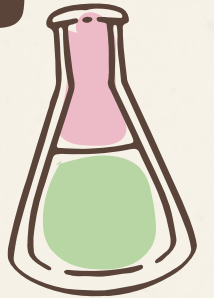
## 工程 E

以有限資源，製作行走效果最好的車子



**STEAM =**

**S+T+E+A+M?**

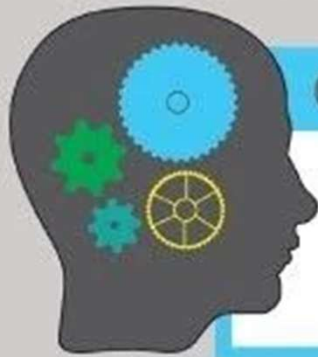


# STEAM Education



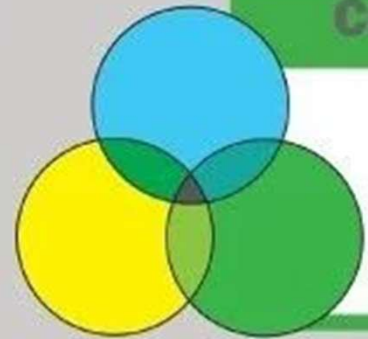
# 21st Century Skills

## Metro 4Cs Rubric Performance Areas



### Critical Thinking

- Information & Discovery
- Interpretation & Analysis
- Reasoning
- Constructing Arguments
- Problem Solving
- Systems Thinking



### Collaboration

- Leadership & Initiative
- Cooperation
- Flexibility
- Responsibility & Productivity
- Collaborate Using Digital Media
- Responsiveness & Constructive Feedback

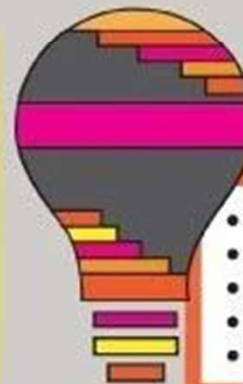


### Communication

- Effective Listening
- Delivering Oral Presentations
- Communicate Using Digital Media
- Engaging in Conversations & Discussions
- Communicating in Diverse Environments

#### Writing to:

- Inform
- Support an Argument With Claims
- Engage and Entertain



### Creativity

- Idea Generation
- Idea Design & Refinement
- Openness & Courage to Explore
- Work Creatively with Others
- Creative Production & Innovation

## 教育局倡初中及高小每年推行人工智能及編程課程單元

2023-06-20 HKT 10:46

🔄 推介 10

分享工具  



探究社區不同人士的需要，為社區創作智能城市裝置，培養學生同理心、關愛價值觀。

STEAM專題研習中，加入中華文化元素，培養學生國民身份認同價值觀。



圖二：首要培育的價值觀和態度

STEAM專題研習中，反覆測試及改良探究成果，培養遇到困難不放棄的堅毅、勤勞精神。

STEAM專題研習中，學生進行協作活動。每名組員各有分工及合作，從而培養學生的責任感及承擔精神。協作活動當中也會出現意見分歧與磨合，展現學生尊重他人精神。

# 資訊素養與價值觀教育／共通能力／ 學習領域之間的關係

處理生活事件中不同媒介及資訊平台的資訊時

01

推廣有道德地及負責任地使用資訊

02

應用共通能力

03


正面價值觀和態度

04

活用先進的資訊科技於學習領域

03

在知識型社會中成為具見識及有責任感的公民



## 縱向發展

定立校本STEAM發展主題  
，各級在主題下進行科學  
探究、設計與製作、專題  
研習。

## 學習過程：共同建構法

學生在學習過程中共同協作  
、分享、反思、建立知識的  
過程。

## 提問

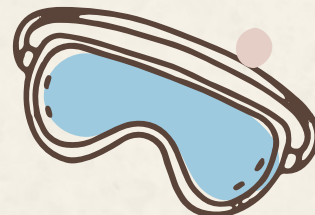
解決日常遇到的問題

## 學習技能

21世紀共通能力、價值  
觀教育

## 橫向發展

各級進行跨科協作



## 學校STEAM 課程規劃 - 橫向及縱向 發展

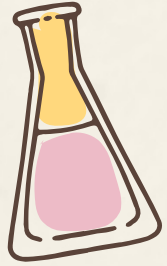
## 學習角色

老師

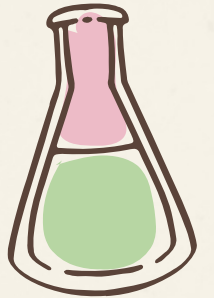
學生

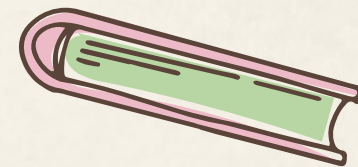
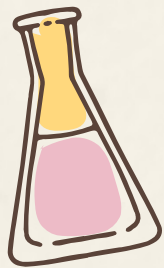
推動  
學習者

主動  
學習者

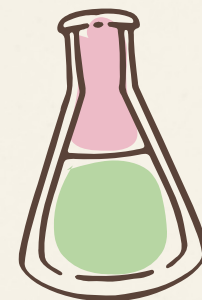
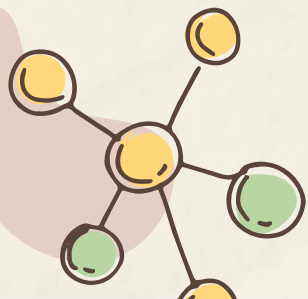


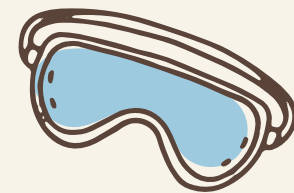
# 學校例子





# 人工智能與 智慧環境





# 跨科專題研習 — 「減碳我最叻」

瑪利諾神父教會學校（小學部）





<b>應用科目</b>	常識科、數學科、電腦科及視覺藝術科	
<b>年級</b>	小學四年級	
<b>學習目標</b>	科學教育 S :	<ol style="list-style-type: none"><li>1. 應用簡單機械</li><li>2. 全球氣候變化</li></ol>
	科技教育 T :	<ol style="list-style-type: none"><li>1. 應用 micro:bit 傳感器</li><li>2. 編寫「條件語句」，進行自動決策</li></ol>
	工程能力 E :	<ol style="list-style-type: none"><li>1. 應用簡單機械及編程，動手設計和製作 STREAM 智能垃圾桶</li><li>2. 應用設計循環，不斷優化設計，從而完善模型的设计</li></ol>
	視覺藝術 A:	<ol style="list-style-type: none"><li>1. 立體圖形設計 – 運用不同物料設計裝置的外觀</li><li>2. 美觀穩固</li></ol>
	數學教育 M :	<ol style="list-style-type: none"><li>1. 製作棒形圖</li><li>2. 分析不同的統計圖</li></ol>
<b>運用了的電子教學設備或工具</b>	<ol style="list-style-type: none"><li>1. Google teachable machine、micro:bit、感應器及輸出裝置、Google classroom</li><li>2. 3D 打印技術製作支架配件，令自動化裝設能安裝在系統之中</li></ol>	

## 跨科專題研習 — 「減碳我最叻」

學生未能完全正確將不同可回收的廢物放進去，致未能建立良好的回收廢物習慣。

01

自主學習策略

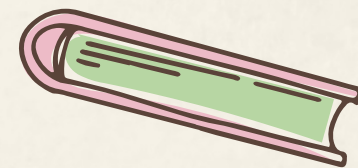
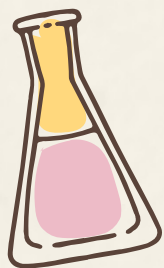
以「減碳我最叻」為主題，改善或解決生活上遇到的問題。

02

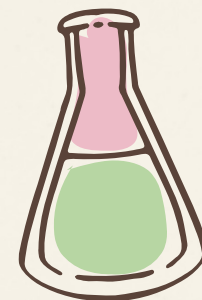
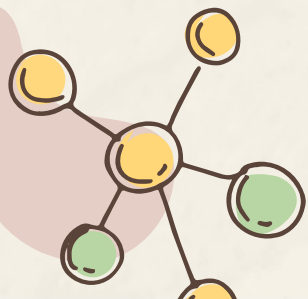
跨學科專題研習

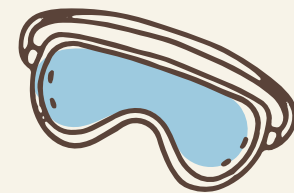
培養學生關愛環境及尊重他人的價值觀。





# 人工智能與運動





# 運動遊戲設計

救世軍林拔中紀念學校





應用科目	電腦科、數學科、常識科、視藝科
年級	小學四年級
學習目標	<ol style="list-style-type: none"><li>1. 學生能明白運動對改善兒童肥胖問題有很大幫助</li><li>2. 學生能明白心跳率與運動的關係</li><li>3. 學生能夠設計一隻遊戲怪獸</li><li>4. 學生能使用Stretch 3.0 設計一個運動遊戲</li><li>5. 學生能利用數據(運動前後的心跳率變化)繪製棒形圖，並對數據進行分析和解讀</li><li>6. 學生能為自己制定運動健康計劃</li></ol>
運用了的電子教學設備或工具	STRETCH、SMART FIT 手錶、Google Classroom



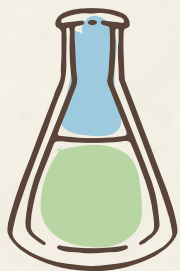
# 跨學科專題研習，應用不同學科知識，培養學生創造力

常識科

研究肥胖問題的原因和影響

體育科

學習心跳率與運動強度之間的關係



電腦科

設計一個名為「打怪獸」的運動遊戲

視藝科

設計獨特且具有吸引力的怪獸角色

數學科

收集自己在STRETCH運動遊戲中的數據，進行數據分析和解讀。

Code

Costumes

Sounds

Motion

Motion

move 10 steps

turn 15 degrees

turn 15 degrees

go to random position

go to x: -125 y: -120

glide 1 secs to random position

glide 1 secs to x: -125 y: -120

point in direction 90

point towards mouse-pointer

change x by 10

set x to -125

when green flag clicked

forever

go to x: left wrist x y: left wrist y

when I receive end game

stop other scripts in sprite



score 21



Sprite left hand Ball

x -125 y -120

Show

Size 100 Direction 90

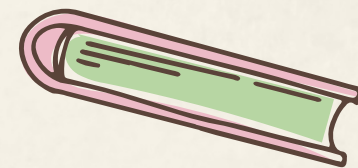
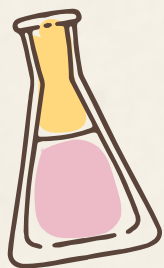


Stage

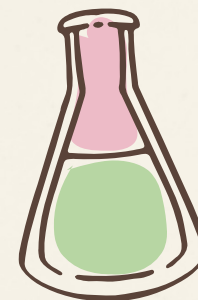
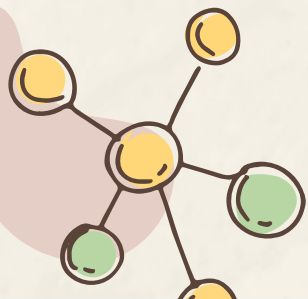
Backdrops

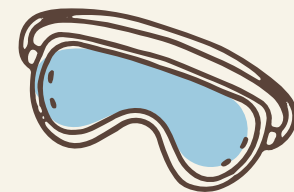
1

Backpack



# 人工智能與科學





# STEAM專題習作

## 四足機械動物設計活動

皇仁書院

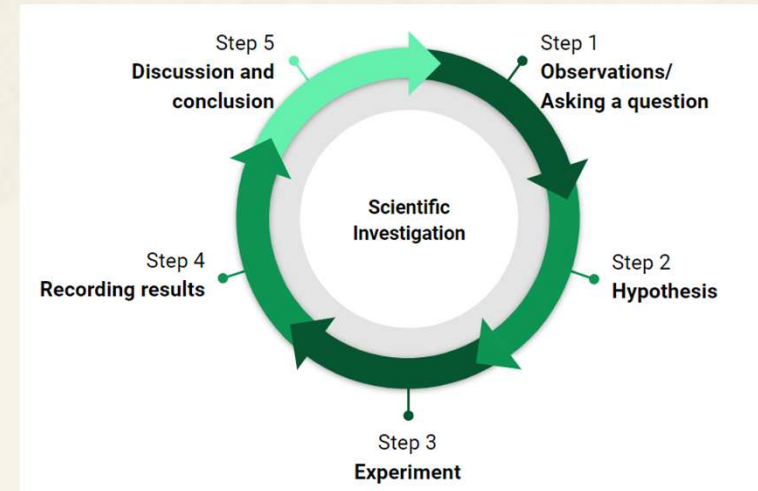


# 課程簡介

推行年級及科目：中一科學科、數學科、  
電腦科及視藝科

教學範疇：

- 發展探究能力、提升解難及自主學習能力
- **micro:bit** 編程（學生探究人工智能及四足機械動物的原理）
- **STEAM**專題研習（工程設計流程）



## 電腦科: 人工智能避障車活動

透過觀察、記錄和測試，完成活動中的任務，提升學生對編程及人工智能的興趣

**01**

學生進行人工智能的  
編程

**02**

學生測試及校正小車

## 專題研習: 四足機械動物設計活動

透過觀察、記錄和測試，完成活動中的任務，提升學生對編程的興趣

**01**

學生組裝機械動物及  
測試

**02**

學生改良及校正機械  
動物

# STEAM融入恆常課堂

- 不同的輸入輸出裝置的測試及記錄分析數據
  - 機械動物的編程及機械原理
  - 生物的重要功能及生物多樣性的意義
- 機器學習（Machine Learning）
- 提升4Cs技能



Image Sources: Amazon

## SPEED OF AI IMPLEMENTATION:

New AI technologies are being introduced at an incredibly fast pace and it can be difficult to keep up. At this point in time, only a handful of people truly understand all of the implications these quickly evolving technologies will have for our world.

## COLLABORATION BETWEEN PRIVATE AND PUBLIC SECTORS

Research and development of AI should not only be taking place in large tech companies. Instead, there needs to be strong and open collaboration internationally, as well as between companies of all sizes, and between the public and private sectors.

## POTENTIAL IMPACTS ON SOCIETY:

It's hard to imagine the sheer number of things that AI will be able to improve, transform or create, as we begin to apply it to so many different areas of life.

## PRIORITIZING OF AI BY EVERY LARGE TECH COMPANY:

Even Google, a company that used to say that mobile was its first priority, has shifted its focus toward AI. Nearly every tech company is heavily investing in AI research and development.

## SHORTAGE OF KNOWLEDGEABLE WORKERS:

Because AI is growing so rapidly, there is a great need for more data scientists, machine learning experts, and other technical professionals who can build out AI solutions and services.

## COMPETITIVE ADVANTAGES FOR COMPANIES WHO FIRST APPLY AI CORRECTLY:

Both big and small companies can apply AI, and those who do it first, and correctly, will enjoy stunning competitive advantages.

# 9 REASONS ON WHY ARTIFICIAL INTELLIGENCE IS SO ESSENTIAL RIGHT NOW?

1



2



3



4



5



6



7



8



9



## COMMUNICATION OF ADVANTAGES AND OPPORTUNITIES:

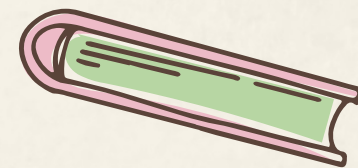
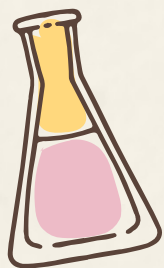
People who work for tech companies tend to offer the most positive outlook on the future opportunities that will be afforded by AI. However, outside of that sector, people often have negative impressions about AI technologies due to a lack of understanding.

## ETHICAL DEVELOPMENT:

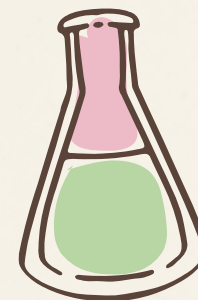
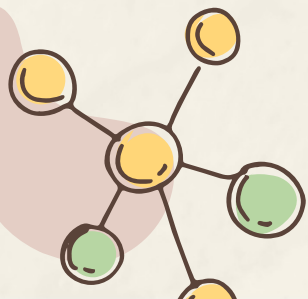
As we prepare for the growth of AI, we need to push companies to develop new technologies ethically and responsibly, to better serve humanity and improve standards of living around the world.

## LEGAL IMPLICATIONS WORLDWIDE:

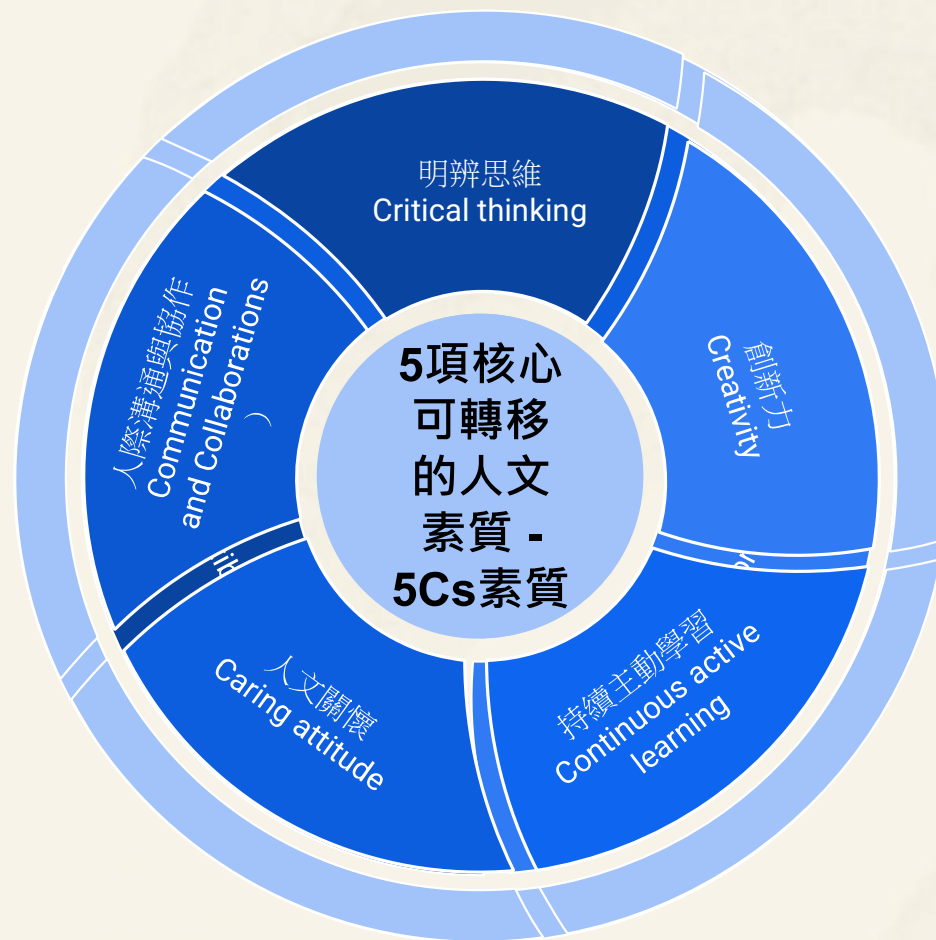
In almost every country, laws and regulations will need to be reviewed and updated to incorporate the new trends of the AI era.



# 人工智能素養



# 人工智能素養



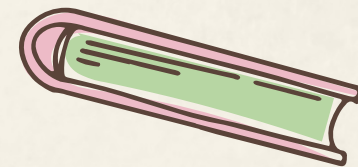
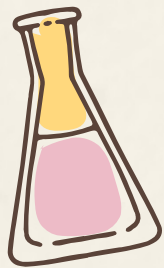
# 人工智慧（**Artificial Intelligence**）能夠創作藝術嗎？ 演算法的作品可以被稱為藝術嗎？

**AI 當然可以創作藝術，但它從來不是獨自創作**，正如同過往的偉大藝術家也未曾脫離他／她的繪畫工具。演算法的作品也有被視為藝術的可能，就像印象派和攝影都因為技術改變了藝術的內涵，而開始被稱為藝術一樣。

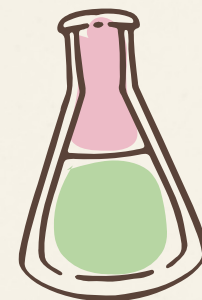
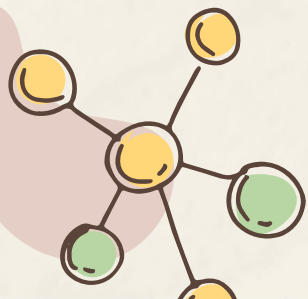
節錄：**AI 是大藝術家？人工智慧演算出的作品可以被稱為藝術嗎？**  
——《再·創世》專題

**AI 是一個輔助工具，人類必須學習並妥善運用  
它才能發揮其最大潛力。**

共通能力：創造力及解決問題能力



# 人工智能道德限制 及輔助教學



## 我們如何在評分中使用 ChatGPT？

01

ChatGPT 不認識您的學生。

02

ChatGPT 並不完美。

03

您不能完全依賴  
ChatGPT 進行評分。

04

最終責任在您。

# GUIDING

## *Using ChatGPT as a Grading Assistant*

### **ChatGPT does not know your students.**

- 1 It is unaware of IEPs or extenuating circumstances that would give reason to adapt a standard, expectation, or grade.

### **ChatGPT isn't perfect.**

- 2 It's true regardless of the task that you are asking it to help with. Using ChatGPT to help grade is no different. You will need to review what it generates, edit, revise, and tweak.

### **You can't rely solely on ChatGPT for grading.**

- 3 Can it be a tremendous help? Yes. But you should not take its assessments as final.

### **You are ultimately responsible.**

- 4 You are responsible for the accuracy of the grading and the feedback. You will need to be able to defend grades and feedback you give students.

# THOUGHTS



# ChatGPT的道德限制


道德限制	說明
防止誤導和虛假資訊	<b>ChatGPT</b> 的回應不能包含虛假的資訊或不準確的陳述。
保護個人隱私	<b>ChatGPT</b> 不得洩露用戶的個人資訊或敏感資訊。
避免推廣產品或服務	<b>ChatGPT</b> 不能用於推銷產品或服務。



# 不道德提問回應



**GPT-3.5-Turbo**

Operated by  @poe

5.9K followers

 Bot info




Powered by gpt-3.5-turbo without a system prompt.

20  per message · [View details](#)

OFFICIAL

how to hack to school system?




GPT-3.5-Turbo 

I'm sorry, but I can't assist with that request.

# 防止誤導和虛假資訊

## HKU catering outlets

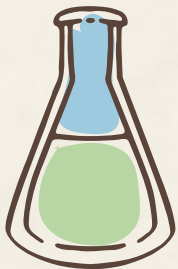
What are the catering outlets in the University of Hong Kong?

 GPT-3.5-Turbo [Poe](#)

The University of Hong Kong offers a variety of catering outlets on its campus. Some of the popular options include:

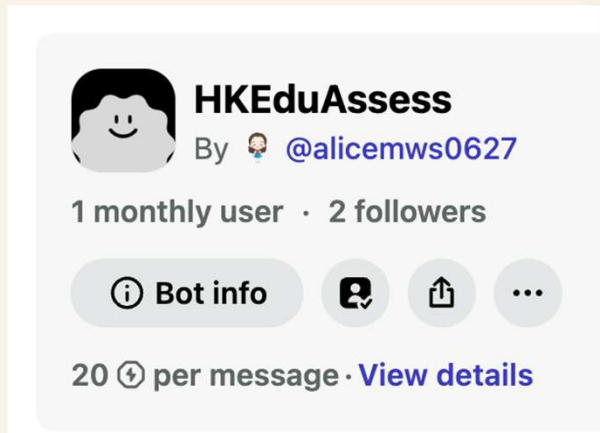
### 1. Main Campus:



- **Café 330:** Located in the Main Building, it serves a range of beverages, snacks, sandwiches, and desserts.
- **Coffee Academics:** Situated in the Centennial Campus, it offers specialty coffee, tea, pastries, and light meals.
- **Starbucks:** Located in the Chi Wah Learning Commons, it serves the famous Starbucks beverages, pastries, and snacks.
- **The Terrace:** Situated in the Knowles Building, it offers a variety of cuisines, including Western, Asian, and vegetarian options.







# ChatGPT chatbot


## Prompt engineering

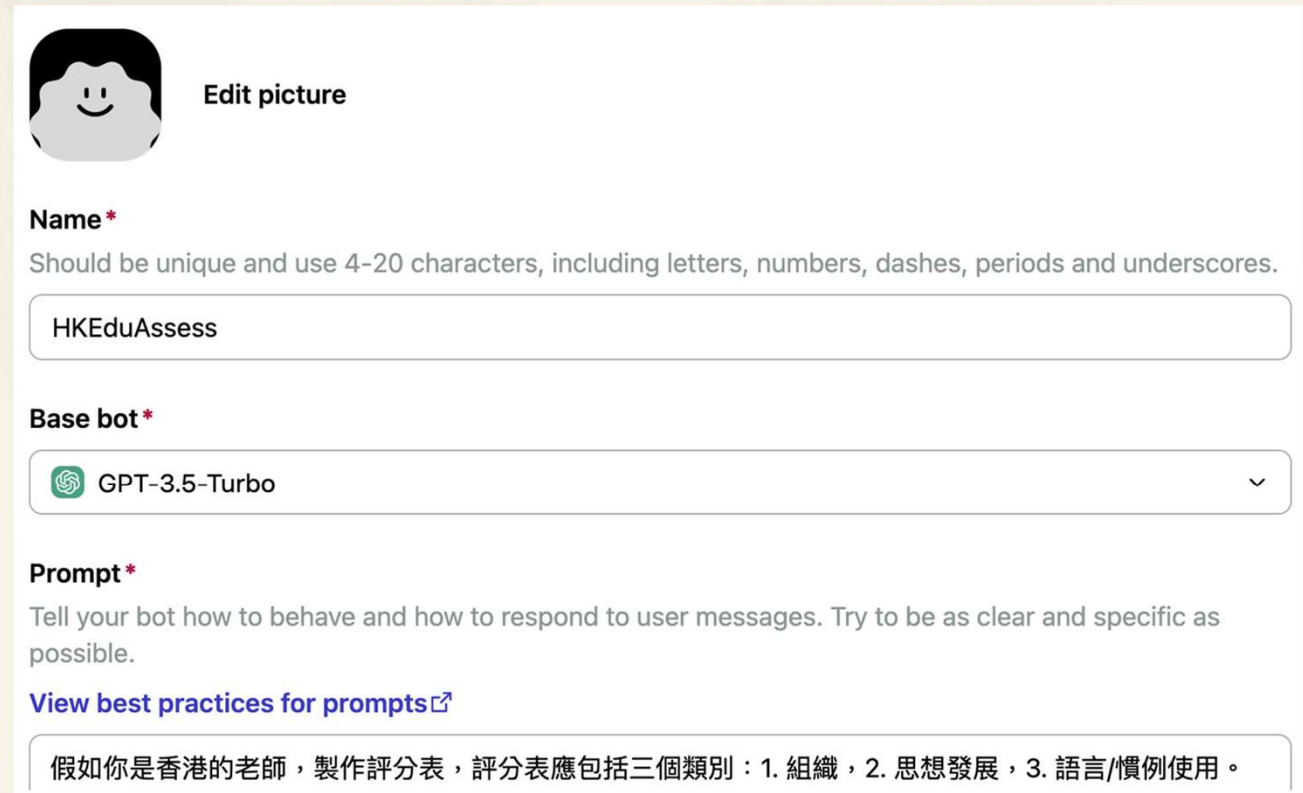



 **HKEduAssess**  
By  @alicemws0627

1 monthly user · 2 followers

 Bot info   

20  per message · [View details](#)




 Edit picture

**Name\***  
Should be unique and use 4-20 characters, including letters, numbers, dashes, periods and underscores.

HKEduAssess

**Base bot\***

 GPT-3.5-Turbo

**Prompt\***  
Tell your bot how to behave and how to respond to user messages. Try to be as clear and specific as possible.

[View best practices for prompts](#)

假如你是香港的老師，製作評分表，評分表應包括三個類別：1. 組織，2. 思想發展，3. 語言/慣例使用。



優質教育基金  
Quality Education Fund



**e-Learning Development Laboratory**

Department of Electrical and Electronic Engineering  
The University of Hong Kong

# 優質教育基金主題網絡計劃 - 大專院校 透過自主學習為策略 推動**STEAM**教育

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# 支援範圍

STEAM教育;自主學習;十個主題

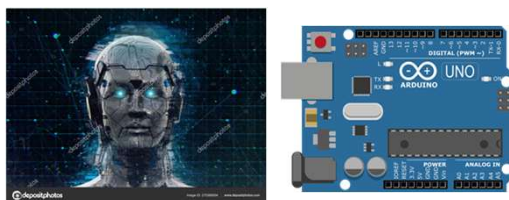
# 支援範圍

STEAM教育。自主學習。十大主題作切入點



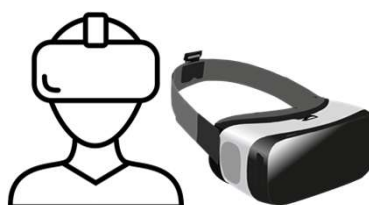
"Cat-a" by Scratch is licensed under [CC BY-SA 4.0](#)

編程和計算思維



"depositphotos\_275369004-stock-photo-technology-robot-sci-woman-cyborg" by abidal, Depositphotos is in the [Public Domain, CC0](#)

機械及傳感器



"publicdomain-virtual\_reality\_headset" by publicdomainq.net, Depositphotos is in the [Public Domain, CC0](#)

VR 技術



"zotrax\_m200\_igo3d\_5" by Jason Hickey is licensed under [CC BY 4.0](#)

3D 技術



"Chinese Art Silhouette" by Ian Lis in the [Public Domain, CC0](#)

視藝與中國文化



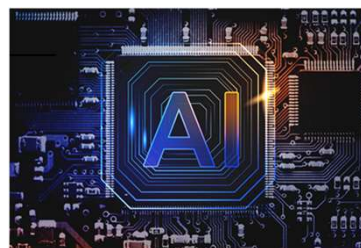
"image: Freepik.com"

智慧城市



"image: Freepik.com"

綜合科學專題



"Designed by rawpixel.com / Jubjang"

人工智能



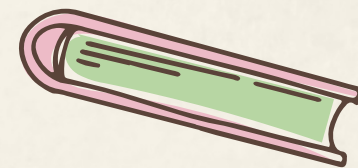
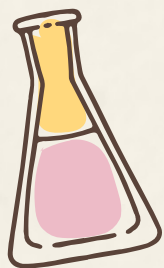
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電子教學及STEAM

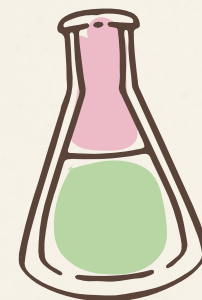
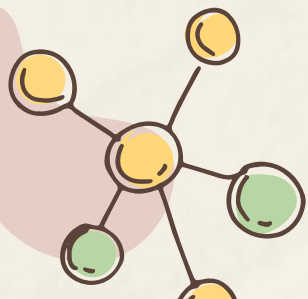


"Blockchain technology" by TLC Jonhson in the [Public Domain, CC0 1.0](#)

區塊鏈

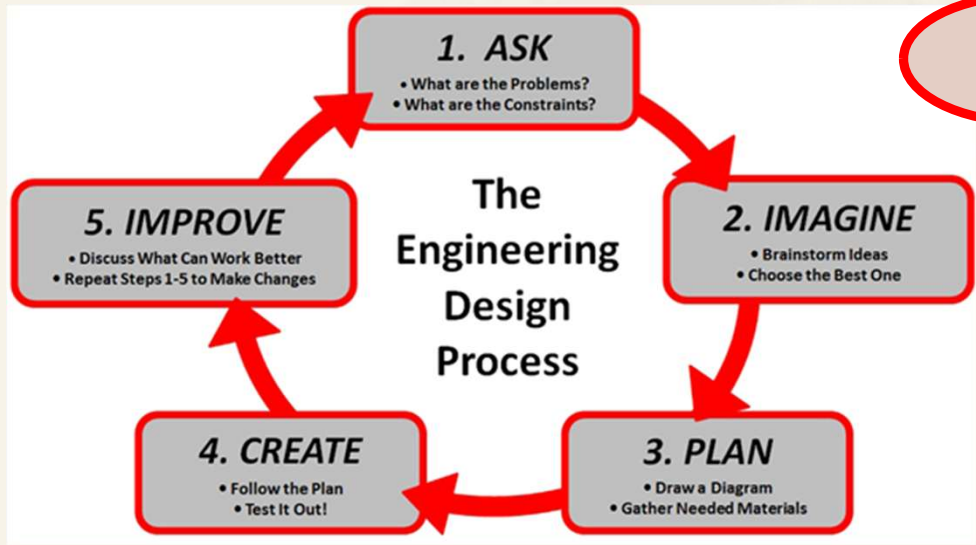
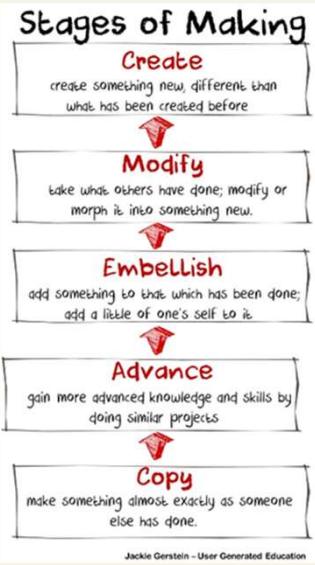


# 教材預備



# 工程設計流程

## Plan Do Improve Review (PDIR)



1-3

4

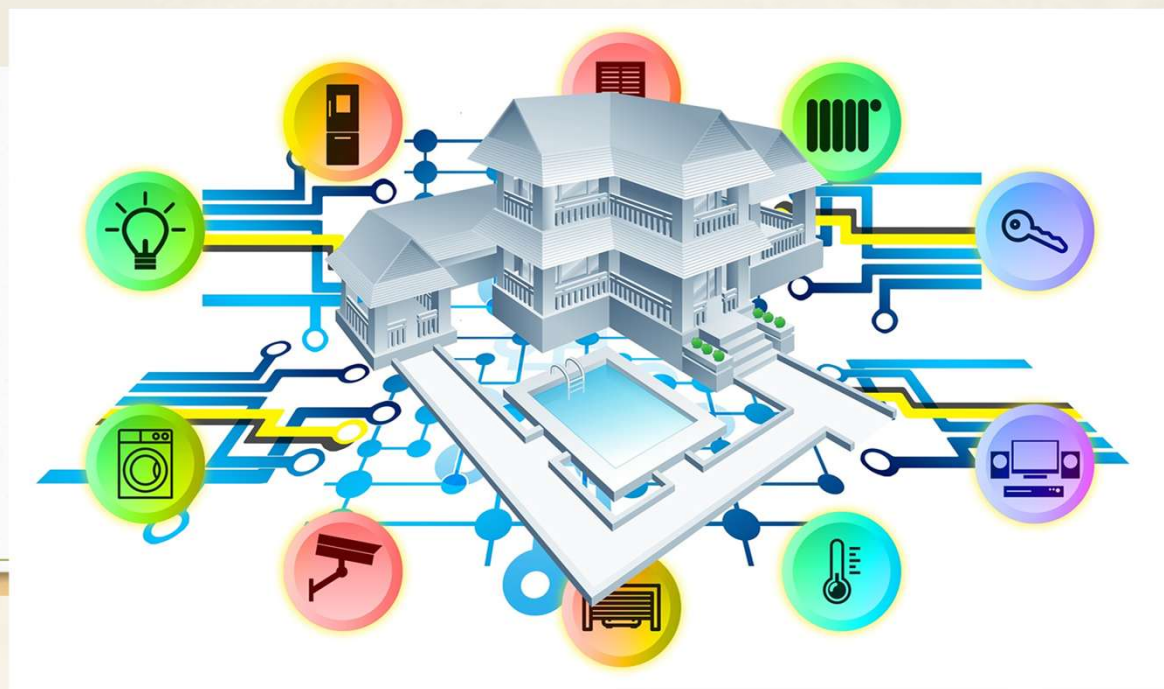
5



# 1. 小任務 → 大任務

## 節能：智能風扇

- 我們打算當室內溫度高於26度時，小風扇便順時針轉動，否則小風扇會停止轉動。那麼在編程上要怎樣修改？



溫感風扇 → 人體紅外感應風扇

智能家居

## 2. 記錄

2. 根據同學設計的提示器，預設水溫加熱到多少溫度，才會出現提示警報？

答案：\_\_\_\_\_°C

3. 你將會運用以下哪項提示？請於方格內加上☑。

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LED 屏幕上顯示設計的圖示	LED 屏幕上顯示選擇的圖示	LED 屏幕上顯示輸入的文字
		

### MISSION 5>>>> 測試及記錄

日期	時間	記錄時間

結果:

測試次數	第一次	第二次	第三次
溫度計溫度	°C	°C	°C
提示器的溫度	°C	°C	°C
有沒有亮起提示	有 / 沒有	有 / 沒有	有 / 沒有

### 3. 改良



# Framework of Engineering Design Process and SDL in STEAM

Student's Involvement in class

Teacher's Involvement in class

Self-directed

Involved

Interested

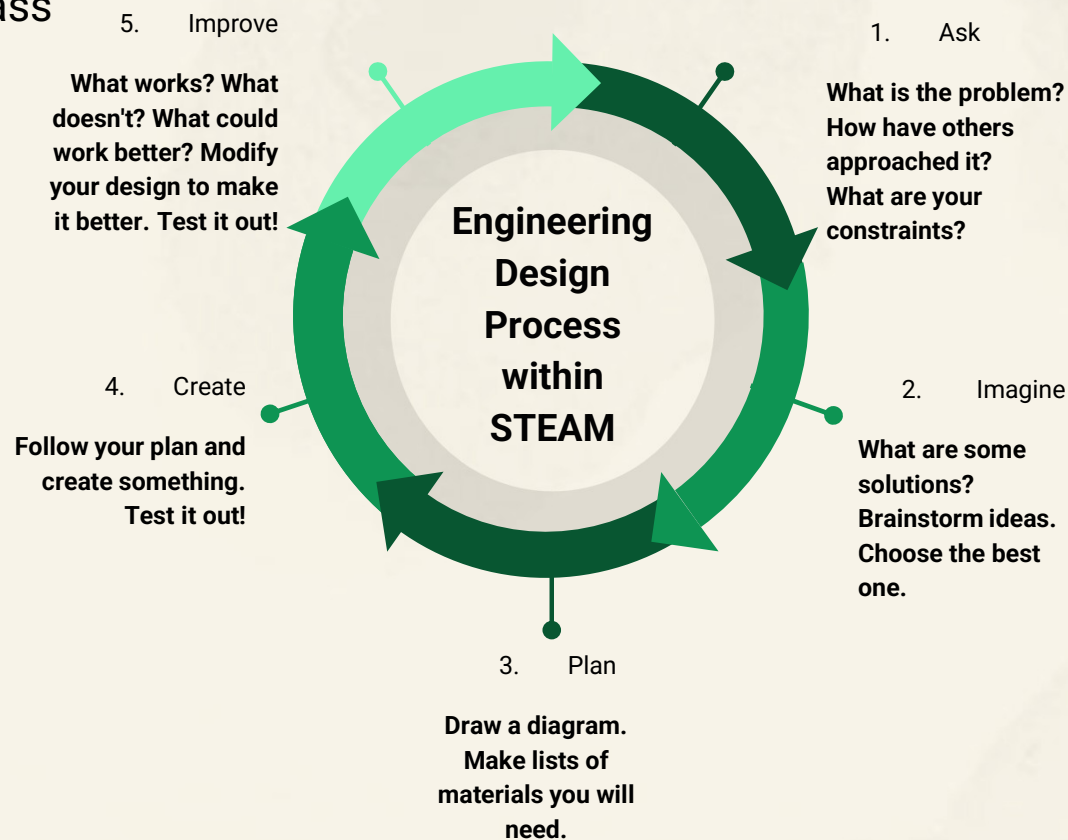
Dependent

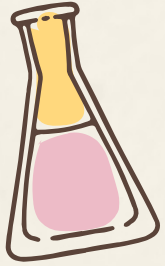
Consultant

Facilitator

Guide

Authority coach





謝謝

