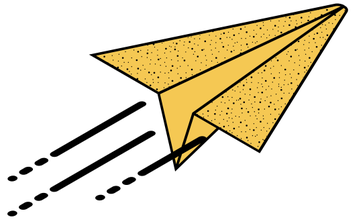
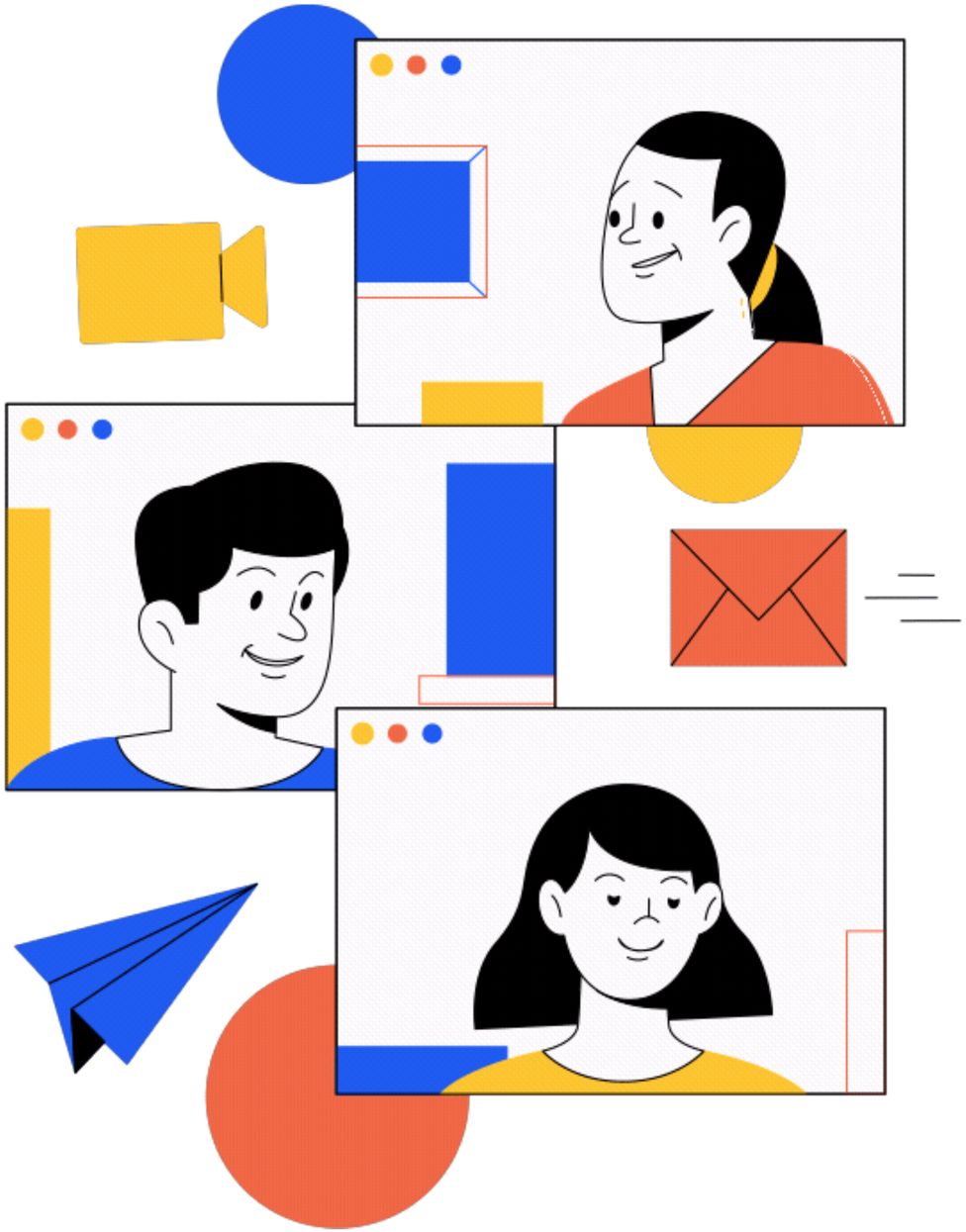
Presented by Una Hsu



Ideal and Practice on Bilingual LT

QingPu Junior High School



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2. Classroom English
3. Course Sequence
4. Multimodality
5. Hands-on Learning Activity

許宜婷

Living Technology Teacher

Introduction

- 國立臺灣師範大學 學碩畢
- 普高暨技高生活科技全一冊(謳馨版&全華版) 編寫委員
- 國民中學生活科技第一～六冊(全華版) 編寫委員
- 國教署科技領域STEM教師海外進修(Sydney・Australia)
- 臺北市立第一女子高級中學 均質化方案講師
- 桃園市自造教育及科技中心 教師增能研習講師
- 臺北市青少年發展暨家庭教育中心 校外教學&冬夏令營講師
- 教育部自造教育及科技領域教學教案設計競賽 金牌
- 全國科學探究競賽這樣教我就懂教師組 第一名
- 中華民國技術士證家具木工丙級

111學年度雙語課程

- 107學年度申請雙語創新教學計畫試辦學校(桃園第一所)
- 111學年度正式掛牌雙語創新學校(桃園為青埔&大園)
- 搭配外師採EMI模式
- 課室英文必須貫徹使用

112學年度雙語課程

- 112學年度延續雙語創新教學計畫
- 「硬體」雙語環境建置　沃土模式
- 「活的」雙語互動環境　(FERTILE)
- 任務導向，強調小組合作
  (unit based)學科單元為主
- 學分班夥伴是強力支柱!
  (澳洲海外進修&清大雙語學分班)

常用之課室英文-進教室篇

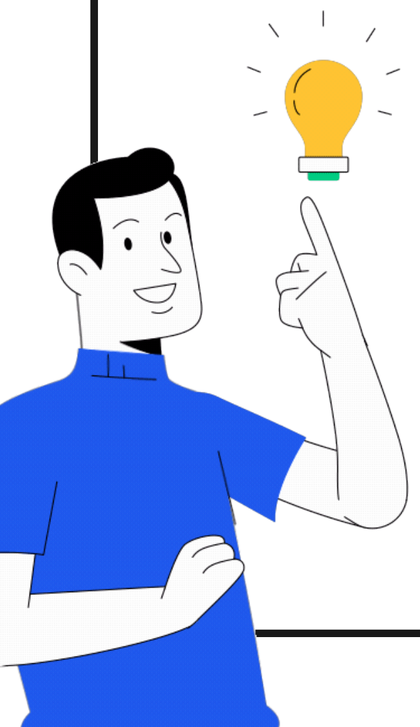
T: Class leader~

S: Stand up!

Hello / Good morning / Good afternoon, Una.

T: Hello / Good morning / Good afternoon!

S: Sit down.



T: Vice Class leader~

Is everyone here?

S: Yes! / XXX請病假 / 有兩個請事假，其餘全到!

常用之課室英文-暖身/總結篇

Please turn to page 60. Last time / Today, we talked about 關鍵字.

So 關鍵字 in Chinese is ____?

What do you know about 關鍵字? you can say it in Chinese or English~

EX: Please turn to page 60.

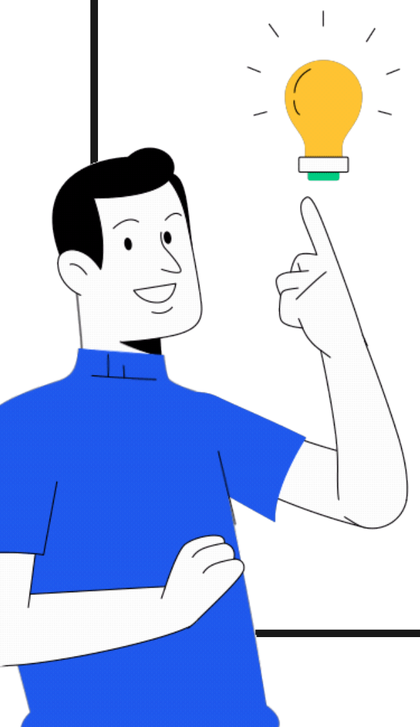
Last time / Today we talked about IoT.

So IoT in Chinese is ____? (Great! Group six 2 points!)

What do you know about IoT? What is IoT and examples?

How does IoT works? you can say it in Chinese or English~

(Great! Group five 2 points!)

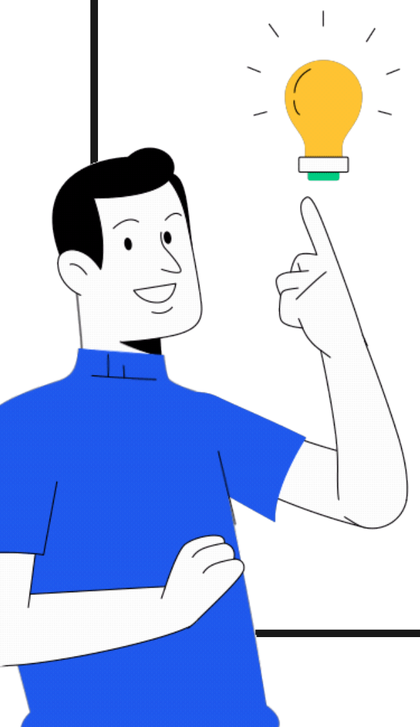


常用之課室英文-畫重點篇

Please turn to page 60.

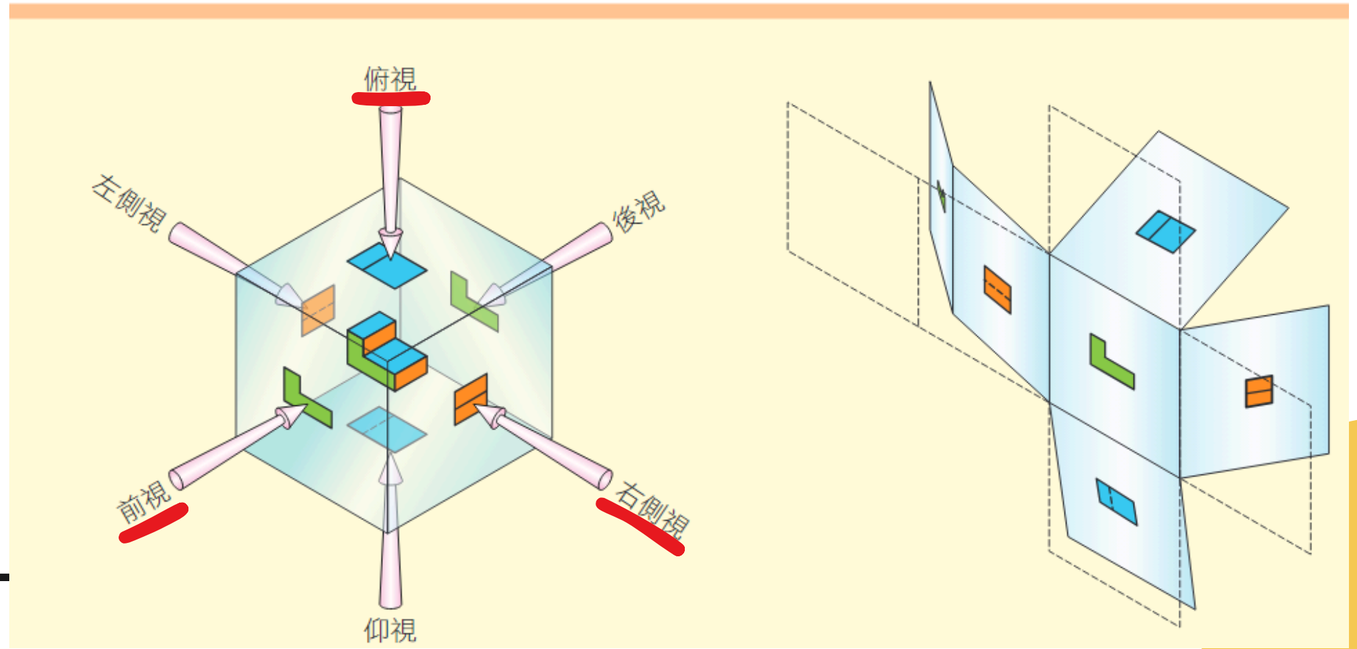
Take out you red pen or highlighter.

Highlight the points.



1 正投影多視圖

繪製正投影多視圖時，是將物體放在由六個投影面所組成的透明箱中（圖 2-2-23A）。從透明箱外觀察物體的六個面向時，原本立體感的物體經正投影後，會產生平面感。打開透明箱展平（圖 2-2-23B）所得的視圖即為正投影多視圖（圖 2-2-23C）。為了簡化視圖，繪製時通常只選擇三個面向來表達，故又稱為三視圖。



常用之課室英文-課程解說篇

There is a way to creating a three view drawing.

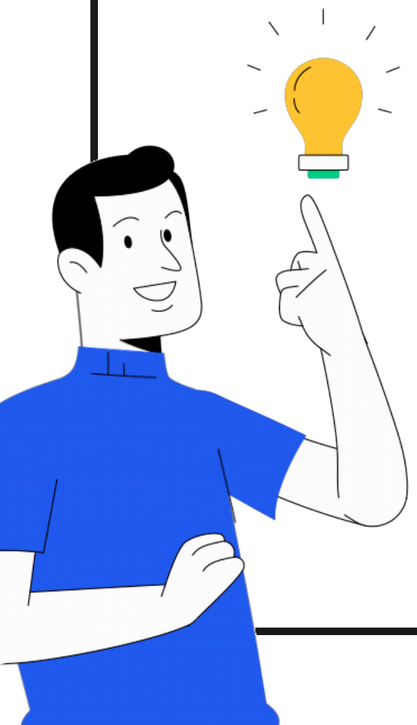
In Chinese we call it 三視圖.

For example, How do you draw a three view drawing step by step?

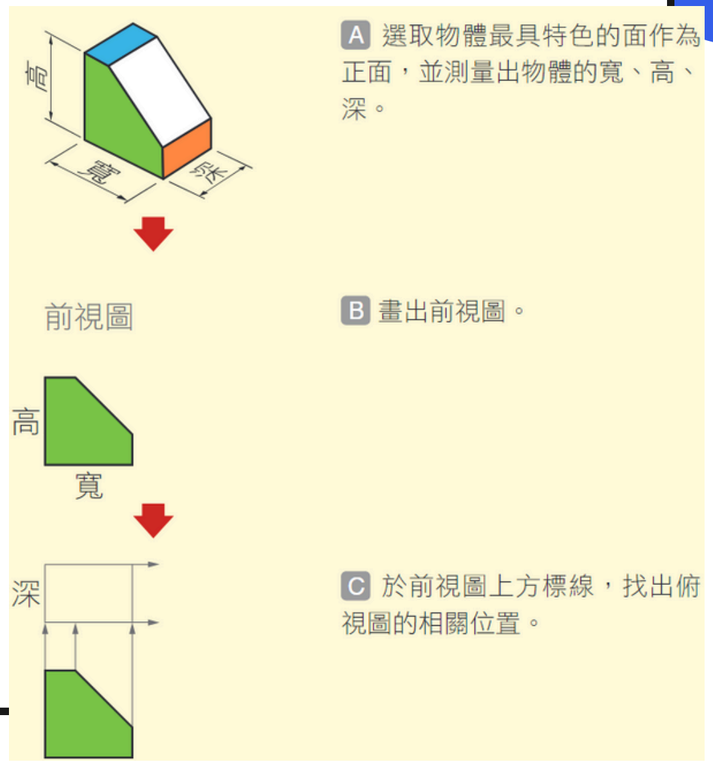
(Great!! 1 point!)

And what are the 3 views of a three view drawing?

(great!! also 1 point!)



- 需看主題決定
- 有順序或圖示為佳



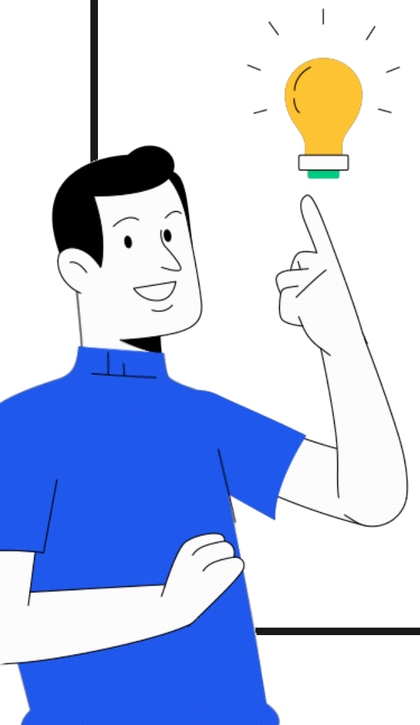
常用之課室英文-學習單篇

T: Every group, come to the stage and get the worksheets.

T: Write down your name, your number and your class.

If you're finished, please look at the board.

Let me know you're ready.



OK, group 1 is ready, group 2 is ready...

Group 5 are you OK? Any questions?

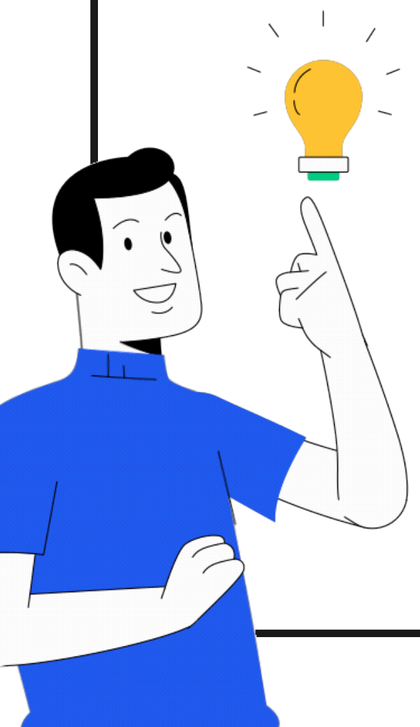
(一開始會比較冷,適時請每一組互相幫忙,會漸入佳境)

常用之課室英文-ipad篇

T: Every group, come to the stage and get 2 ipads.

T: Open the ipad, scan the QR code on the board.

If you're finished, please show me your ipad.



OK, group 1 is ready, group 2 is ready...

Group 5 are you OK? Any questions?

(一開始會比較冷,適時請每一組互相幫忙,會漸入佳境)

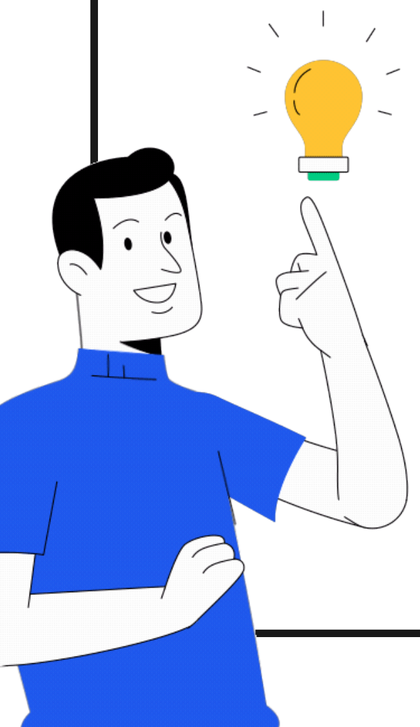
常用之課室英文-確認理解篇

T: If you totally understand, raise your hand.

T: If you understand about 50%, raise your hand.

T: If you don't understand anything, raise your hand.

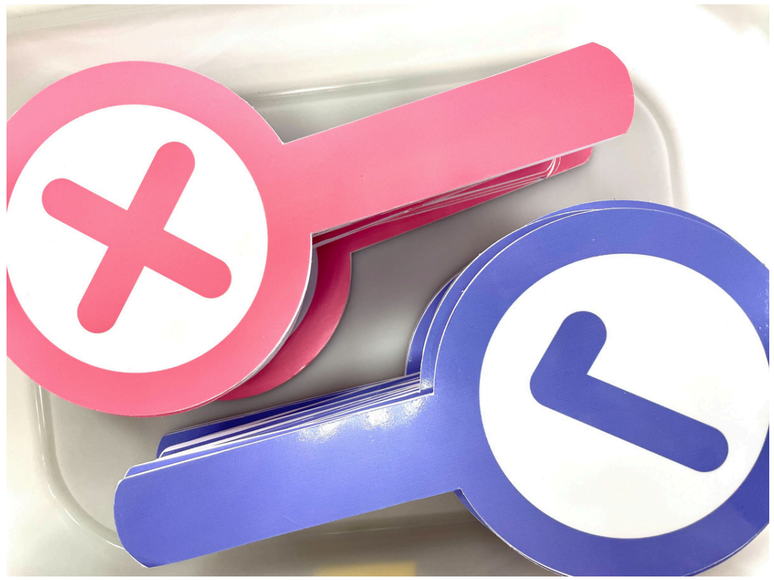
T: Anyone who can translate for us? (XXX, can you translate for us?)



Thank you, Una. Any one any questions?

I' ll give you 10 minutes!

(利用手牌可掌握學生理解狀況)



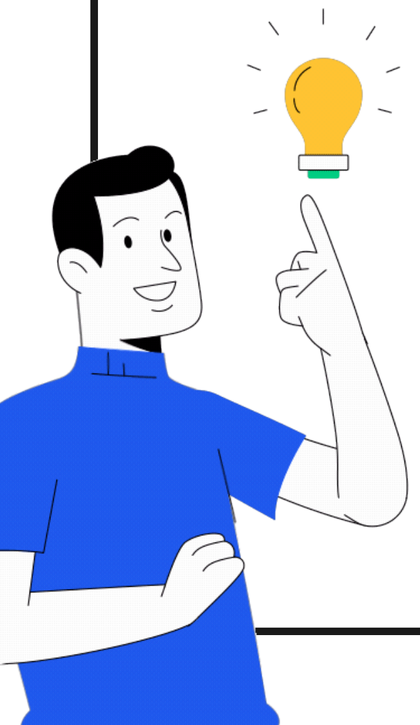
常用之課室英文-結算分數篇

OK. let's call it a day!

Let's see how many points we get!

Group 1, 8 points!

Group 2, 9 points! ...

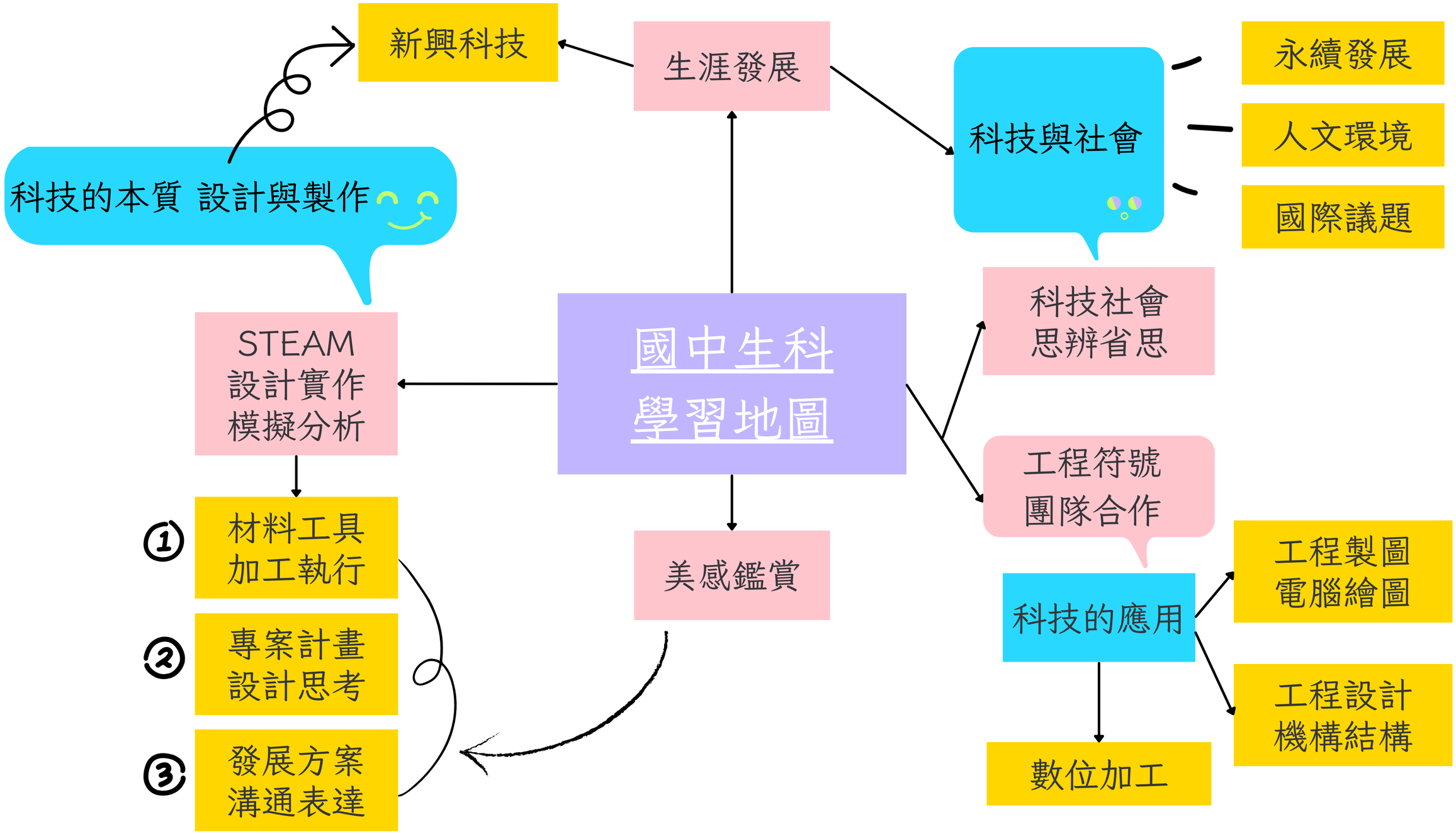


So our first prize goes to group 3~

The second prize goes to group 4~

Group 3 and group 4, come get the cookies.

9										
10	組別	組記分	組任務	座號	姓名	出席	記分	任務	正解互動	學生作答
11	組別1	7	0	1	王于亞	未點名	0	0	0	
12	組別3	8	0	2	田麒銘	未點名	0	0	0	
13	組別3	8	0	3	江宗霖	未點名	0	0	0	
14	組別3	8	0	4	池翊碩	未點名	0	0	0	
15	組別5	8	0	5	李沅軒	未點名	0	0	0	
16	組別6	6	0	6	宓位錦	未點名	0	0	0	
17	組別3	8	0	7	林宥承	未點名	0	0	0	
18	組別2	8	0	8	林羿澄	未點名	0	0	0	
19	組別4	6	0	10	康瑞	未點名	0	0	0	
20	組別1	7	0	11	曹力穠	未點名	0	0	0	
21	組別5	8	0	12	楊良峻	未點名	0	0	0	
22	組別1	7	0	13	謝祥恩	未點名	0	0	0	
23	組別5	8	0	14	鍾安喆	未點名	0	0	0	
24	組別2	8	0	15	鄧尚永	未點名	0	0	0	
25	組別1	7	0	21	何以凡	未點名	0	0	0	
26	組別4	6	0	22	呂佳妮	未點名	0	0	0	
27	組別6	6	0	23	李宥彤	未點名	0	0	0	
28	組別5	8	0	24	沈云蕎	未點名	0	0	0	
29	組別6	6	0	25	林曉禧	未點名	0	0	0	
30	組別4	6	0	27	袁苧釉	未點名	0	0	0	
31	組別2	8	0	28	陳天螢	未點名	0	0	0	
32	組別4	6	0	29	陳彥伶	未點名	0	0	0	
33	組別2	8	0	30	楊巧涵	未點名	0	0	0	
34	組別6	6	0	31	蔡可恩	未點名	0	0	0	
35	組別4	6	0	33	鄭貝寧	未點名	0	0	0	
36	組別5	8	0	34	謝心瑜	未點名	0	0	0	
37	組別2	8	0	35	徐昱婕	未點名	0	0	0	
38										


國中生科學習地圖
生涯發展
新興科技
科技的本質 設計與製作
科技與社會
永續發展
人文環境
國際議題
科技社會思辨省思
工程符號團隊合作
科技的應用
工程製圖電腦繪圖
工程設計機構結構
數位加工
STEAM設計實作模擬分析
①材料工具加工執行
②專案計畫設計思考
③發展方案溝通表達
美感鑑賞

Nature

IoT智慧化遠端資訊回饋節能屋(物聯網)
AI, DRAW就對了!(人工智慧)
超前部署-氣象預報燈(API)
3D列印光控小夜燈

Production

夜光熠熠-壓克力燈座&觸控燈
創意「時」代 •「鐘」於設計
線控競速對決
星際大戰光劍
無人機設計與實作
不插電-木質音箱

N P A S

Application

循跡避障自走車(Arduino)
動力(液壓)機械手臂
Automata
橋樑的結構-桁架橋

Society

Green起來-世界建築之美
核電以後-臺灣的未來(辯論式教學)
Farm足計劃-活「農」活現(食農教育)

What is Content and Language Integrated Learning?

both language and the subject have a joint role

Marsh, D. (ed.) (2002). *CLIL/EMILE the European Dimension*. University of Jyväskylä.

1. Setting the learning objectives

- No. 1 rule: Content and language objectives SHOULD be closely related
- Identify the content objectives first then set the related language objectives

Content objectives usually involve

- "concepts" or "knowledge" of the topic
- cognitive skills or thinking skills, e.g.

能透過視圖重製立體圖形

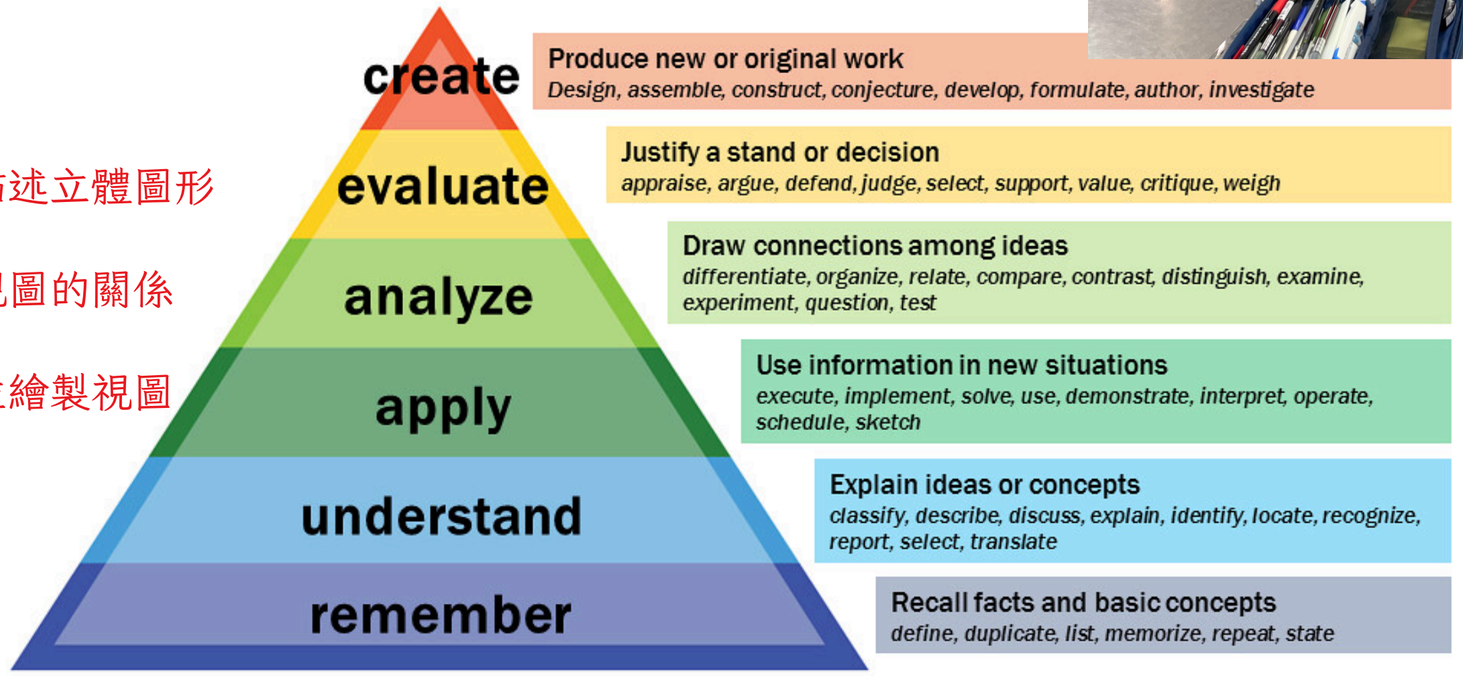
能思考選擇合適的三視圖來描述立體圖形

探討立體圖形的觀察位置與視圖的關係

利用立方積木製作立體圖形並繪製視圖

理解立體圖形及其三視圖

能認識立體圖的特性與種類



Anderson, L. W., and Krathwohl, D. R., (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives.* New York: Longman.

An example from trial and error

- Prepositions - We put the Egg into, on, under...
- Target students: Grade 7 in English immersion
- Objectives:
  - Content:

    understanding an instruction and think how to protect an egg when released from a height
  - Language:

    consolidating the knowledge of using verbs in relation to the actions performed

Focus on content

- Ss watch a video about the Egg Drop Challenge
- T and Ss discuss the a way of protecting their egg in order to make it able to survive a fall from approximate 2 meters of height

核心抽象概念講述(國語)

- Ss read the transcript of the video with materials bolded
- T guides Ss to pronounce language chunks presented to them (e.g. I have…my egg on/into…)

Predominant focus on language

- Ss make sentences to describe important prepositions of an egg and a bag of materials
- T gives corrective feedback

課室指導延伸活動(英語)

Focus on content

- Ss construct something out of these materials to protect the egg from the impact of the fall
- T gives feedback on both content and language

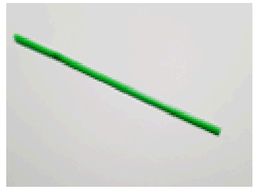
MATERIALS
word wall

Date :

Team Members :

string stick straw sticky tape egg

balloon scissors plastic bag rubber band



Date :

Team Members :

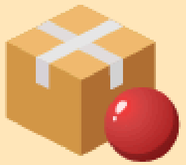
sentence structure

"The_____ is_____the_____."

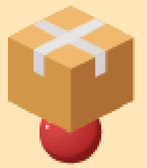
material preposition material

In front of the ____

Behind the ____

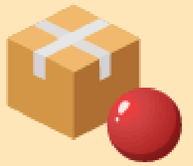

Next to the ____

On the ____


Under the ____

In the ____

Between the ____s/es


Near the ____

Among the ____s/es

Learning that Words Make Sentences:

1. The_____ is_____the_____.
2. The_____ is_____the_____.
3. The_____ is_____the_____.
4. The_____ is_____the_____.
5. The_____ is_____the_____.

The eggfall - first attempt

Date :

Team Members :

What have you done to protect the egg?

What do you think is going to happen to the egg?

What happened to the egg? What went wrong?

The eggfall - second attempt

Date :

Team Members :

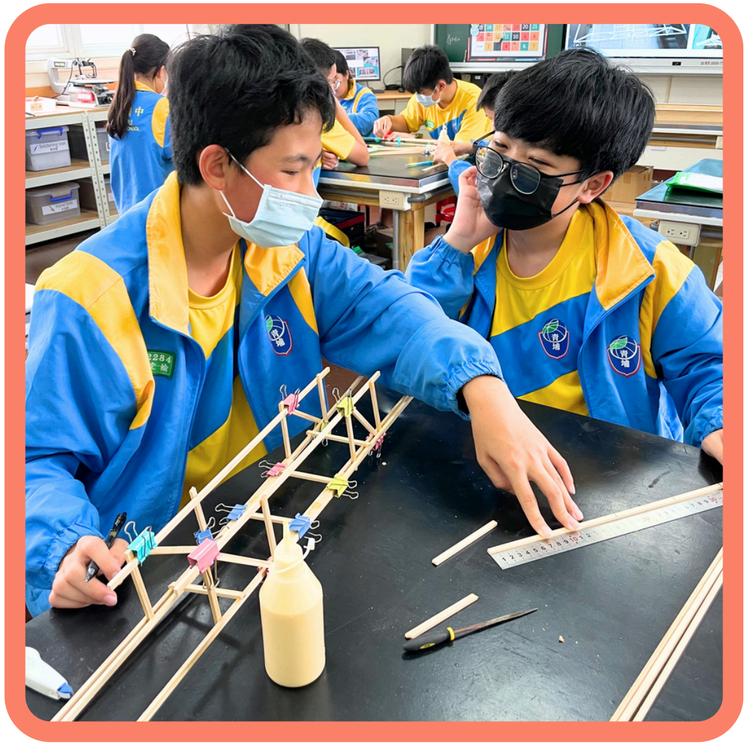
What have you done to protect the egg this time?

What do you think is going to happen to the egg?

What happened to the egg? What went wrong?

Assessment

Assessment has so far been something of a blind spot in many CLIL programmes



Massler, U., Stotz, D., & Queisser, C. (2014). Assessment Instruments for Primary CLIL: The Conceptualisation and Evaluation of Test Tasks. *Language Learning Journal, 42*(2), 137-150.

Why is it important?

- “Backwash” effect: the influence of assessment on teaching and learning behaviours
- In some CLIL contexts, students are affected by the high-stakes examination

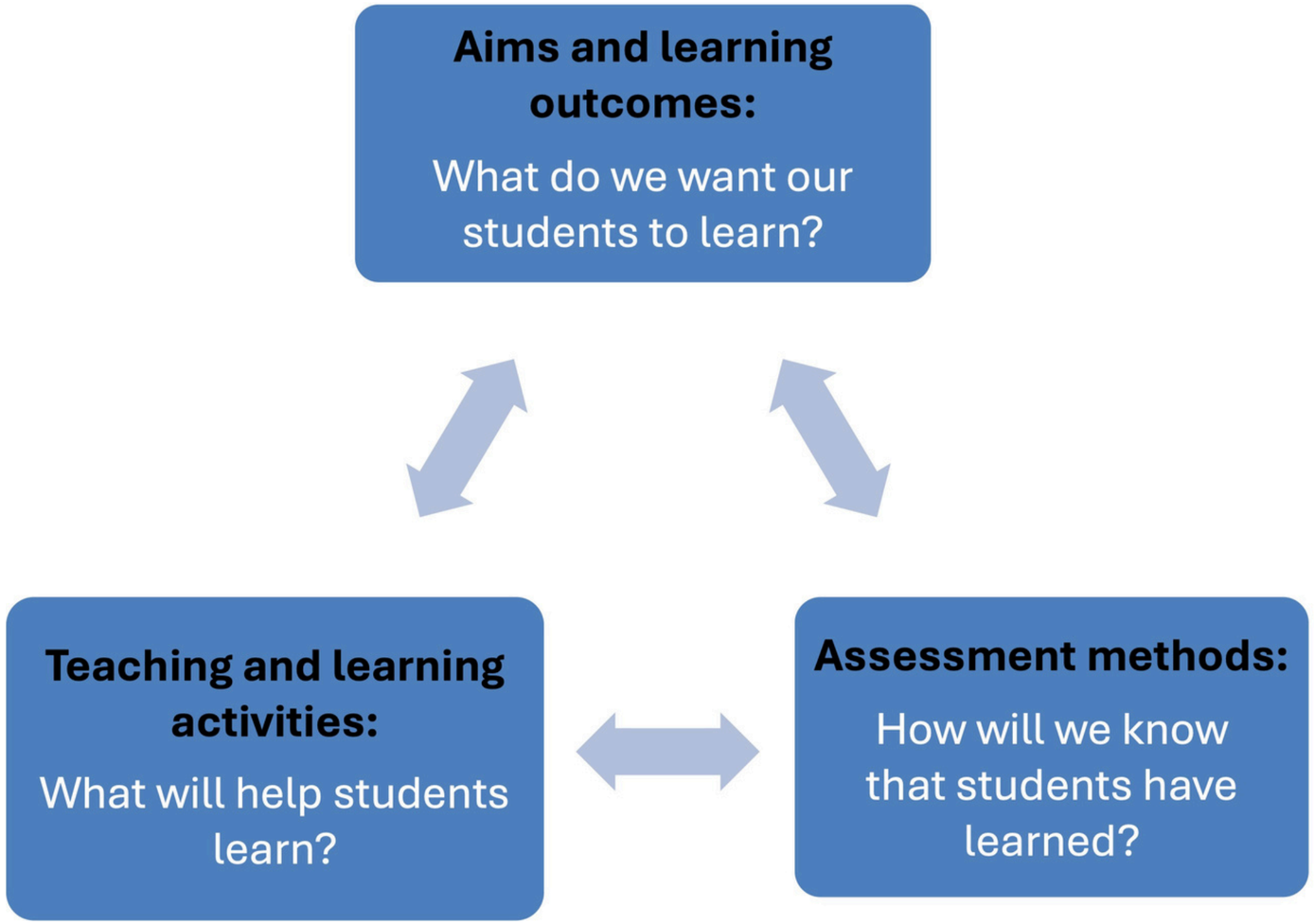
Alderson, J. C., & Wall, D. (1993). Does Washback Exist? *Applied Linguistics, 14*(2), 115-129.

Assessment

- **What to assess?**
  - factual recall
  - general understanding or application
  - specific vocabulary, sentence patterns
- **When to assess?**
  - in lessons (by questioning & giving feedback)
  - at the end of a lesson/ unit/ topic/ term
- **How to assess?**
  - by formative assessments (e.g. worksheets, homework)
  - by summative assessments (e.g. tests, examinations)
  - individual work or group work?
  - oral or written?

Coyle, D., Hood, P., & Marsh, D. (2010). *CLIL: Content and Language Integrated Learning*. Cambridge: Cambridge University Press.

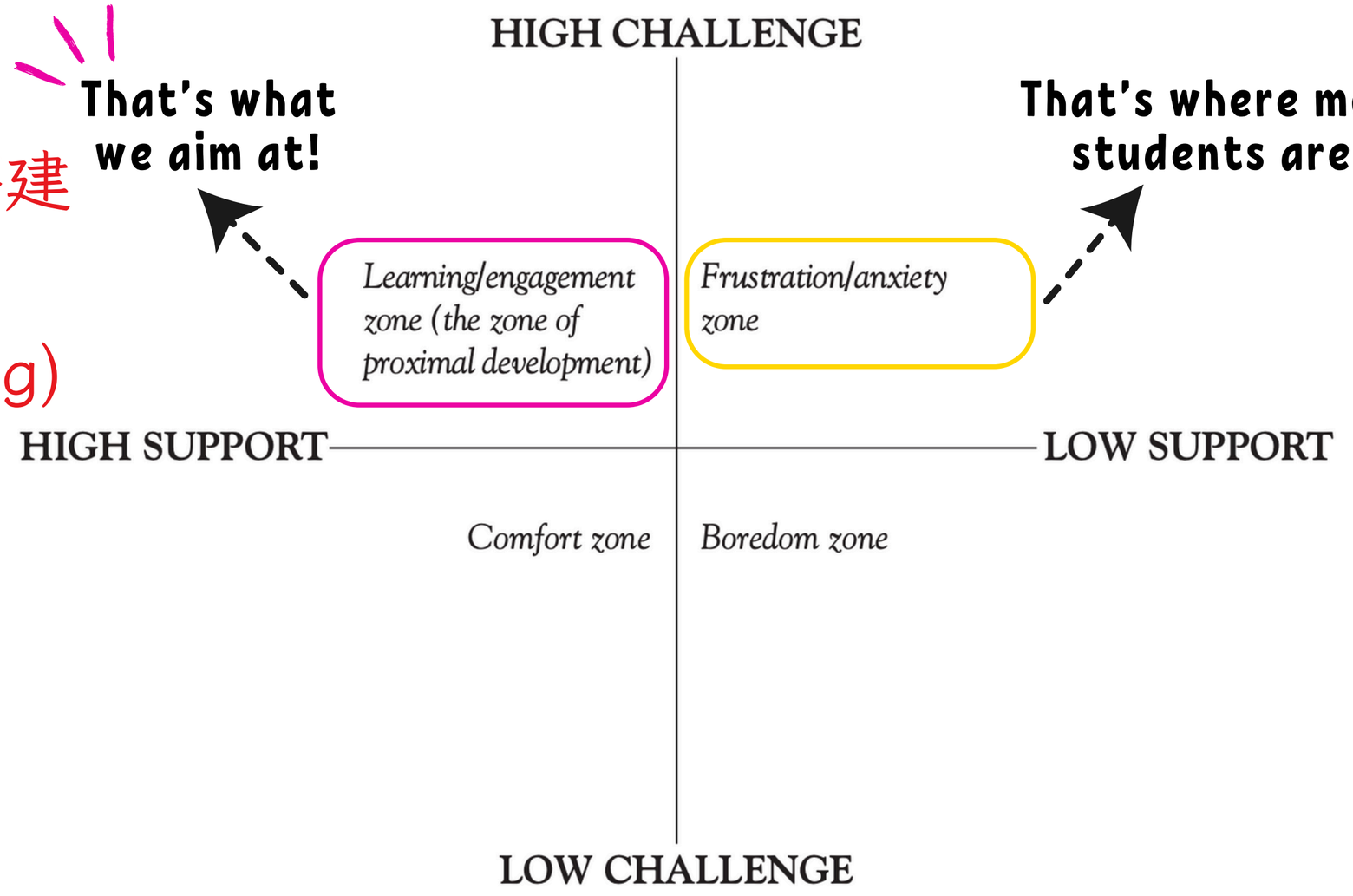
Objectives, Instruction & Assessment



Anderson, L. W., and Krathwohl, D. R., (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives.* New York: Longman.

Challenge vs Support: Different implications

協助學生搭建語言之鷹架 (scaffolding)



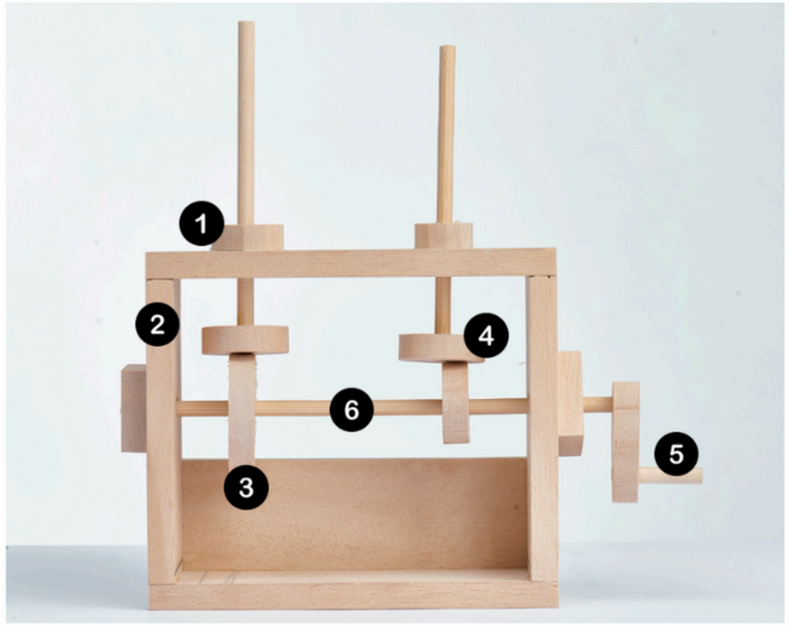
Mariani, L. 1997. "Teacher Support and Teacher Challenge in Promoting Learner Autonomy." *Perspectives: A Journal of TESOL Italy 23*(2).

Hong Kong EMI

Linguistic\Content Demand	Recall	Application	Analysis
Vocabulary – Receptive Skills – Productive Skills			
Sentence patterns – Receptive Skills – Productive Skills			
Text – Receptive Skills – Productive Skills			

Figure 3. A framework to evaluate the linguistic/content demand of assessment tasks

After completing the mechanical puppet, it is necessary to check whether the rotations, movements, and swings match the initial design.



1 slider

2 frame structure

3 cam

4 cam follower

5 handle / crank

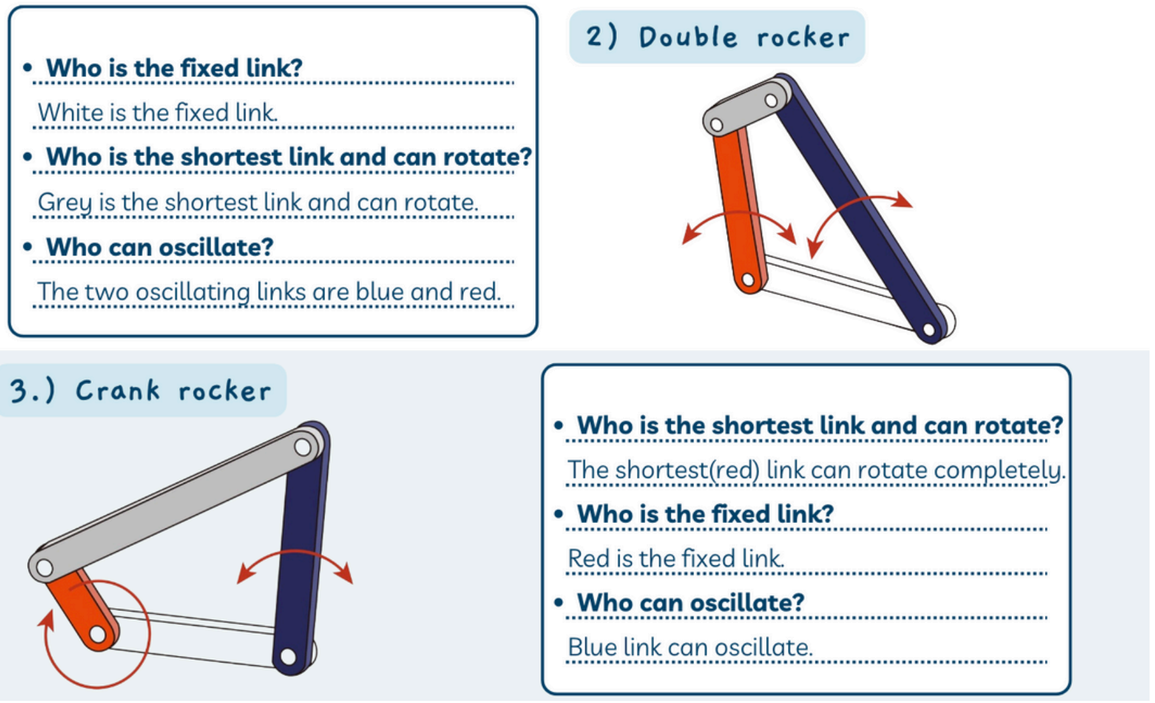
6 rotating axle / shaft

Lo, Y. Y., & Lin, A. M. Y. (2014). Designing assessment tasks with language awareness: Balancing cognitive and linguistic demands. *Assessment and Learning, 3*, 97-119.

Hong Kong EMI

Linguistic\Content Demand	Recall	Application	Analysis
Vocabulary – Receptive Skills – Productive Skills			
Sentence patterns – Receptive Skills – Productive Skills			
Text – Receptive Skills – Productive Skills			

Figure 3. A framework to evaluate the linguistic/content demand of assessment tasks



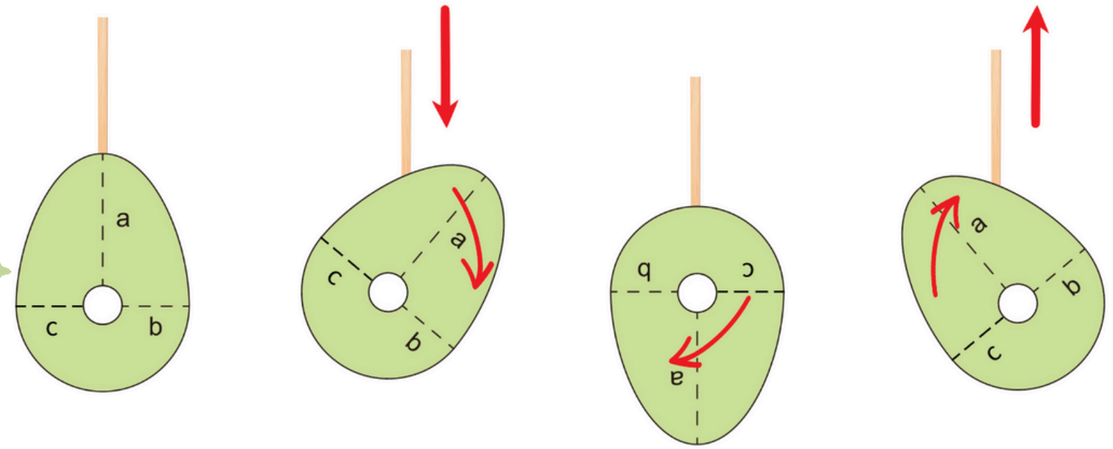
Lo, Y. Y., & Lin, A. M. Y. (2014). Designing assessment tasks with language awareness: Balancing cognitive and linguistic demands. *Assessment and Learning, 3*, 97-119.

Hong Kong EMI

Linguistic\Content Demand	Recall	Application	Analysis
Vocabulary – Receptive Skills – Productive Skills			
Sentence patterns – Receptive Skills – Productive Skills			
Text – Receptive Skills – Productive Skills			

Figure 3. A framework to evaluate the linguistic/content demand of assessment tasks

2 Shown below is a typical Cam and Follower:



-Select the correct name for each part of the cam profile using the following terms:
Rise 、 Fall 、 Dwell

a-c:_**Fall**_ c-b:_**Dwell**_ b-a:_**Rise**_

-State how far the follower will fall when the cam turns 180° clockwise. **a-c/a-b** mm

-Explain what is meant by the term Dwell.

**The follower will be in the same position.**

Lo, Y. Y., & Lin, A. M. Y. (2014). Designing assessment tasks with language awareness: Balancing cognitive and linguistic demands. *Assessment and Learning, 3*, 97-119.

Hong Kong EMI

Linguistic\Content Demand	Recall	Application	Analysis
Vocabulary – Receptive Skills – Productive Skills			
Sentence patterns – Receptive Skills – Productive Skills			
Text – Receptive Skills – Productive Skills			

Figure 3. A framework to evaluate the linguistic/content demand of assessment tasks

Analyze the problems with your automata and answer the questions.

1- What do you think of your cam's shape?
Is it too pointed? Too round? Is the size too large?
2- What do you think of the installation position?
Is the camshaft installed too high? Too low?
Is anything wrong about the arrangement of the puppet and scene?
3- What do you think of the points of action?
Is the cam follower too short or the puppet too light?
Is the contact position between the cam follower and the cam incorrect?

Brainstorm Solutions:

Draw an automata toy below with a cam mechanism. Label the cam, follower, slider, and any linear/rotary movement.

Lo, Y. Y., & Lin, A. M. Y. (2014). Designing assessment tasks with language awareness: Balancing cognitive and linguistic d

Five Basic Types of Bridges

梁橋斜撐

- **斜撐**可分散橋面向下的受力，讓梁橋的結構更加穩固。

structure

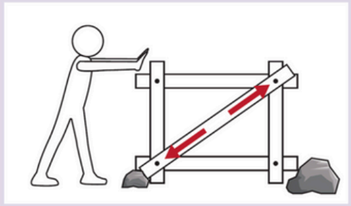
從河岸兩側向橋面斜撐

延伸學習 斜撐

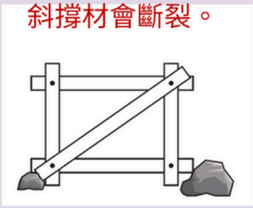
C、四邊形結構加斜撐：

斜撐材對抗**張力**，防止向外擴張。

tension



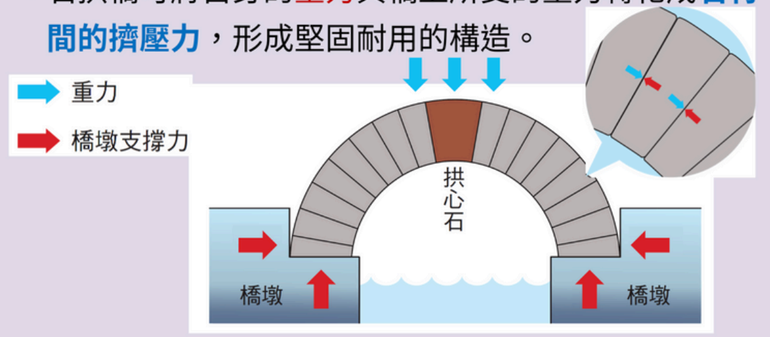
若拉張力過大，斜撐材會斷裂。



延伸學習 石拱橋的搭建

gravity

- 石拱橋可將自身的重力與橋上所受的重力轉化成**石材間的擠壓力**，形成堅固耐用的構造。

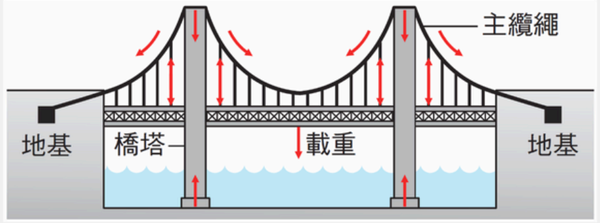


吊橋結構

cable

- 吊橋是以主纜繩的張力與橋塔的抗壓力來支撐載重。
- 主纜繩為鋼筋，固定於**地基**之上，搭配細鋼纜或鐵鏈懸掛橋面。

ground

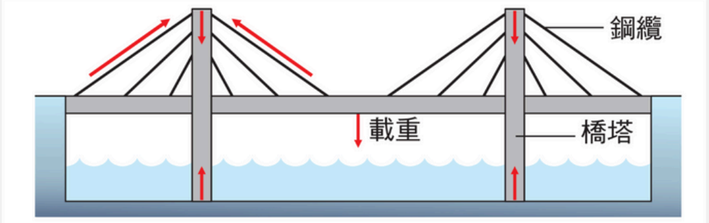


斜張橋結構

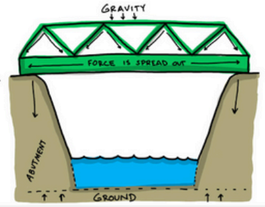
deck

- 鋼纜從橋面「斜拉」至橋塔。
- 橋墩基礎深入河川岩盤，與橋塔一體成形，使其足以支撐橋面鋼纜的張力。

pier



Truss Bridge

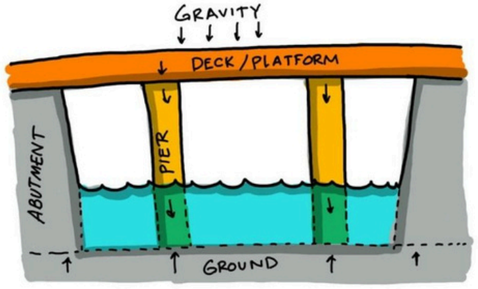


Like a simple beam bridge, the Truss Bridge uses decking across a span supported by abutments and sometimes piers. A truss bridge also has **triangle** sections across the deck that will carry different forces (**tension** and **compression**) ultimately to the ends (abutments). This spreads out the force across the deck, making the bridge stronger.

FIVE BASIC TYPES of Bridges

cable	**bridge**	**force**	**gravity**
deck	**structure**	**Suspension Bridge**	**abutment**
triangle	**tension**	**pier**	**Arch Bridge**
span	**strong**	**Cable-Stayed Bridge**	**compression**
ground	**Truss Bridge**	**Beam Bridge**	**support**

Unlike structures built directly on the ground, _____ is a big problem for bridges. As gravity pushes down on a _____ built on land, the ground is also pushing back up. Bridges lack this advantage! They go across a gap where the ground is not there pushing back up from underneath. To overcome this problem, people design _____s to transfer the force that gravity is exerting on the bridge deck to the ground through different methods.

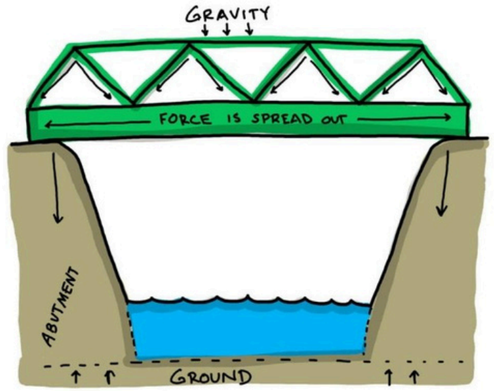


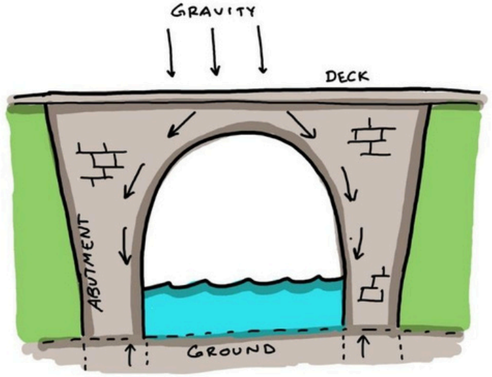
_____

This is the simplest type of bridge with decking that _____s a gap supported by _____s on either side. Piers, which can help carry the load of the bridge, are sometimes used under the bridge in between abutments for added _____. When weight is exerted down on the bridge, the force/stress is spread and directed into the abutments and _____s.

_____

Like a simple beam bridge, the bridge uses decking across a span supported by abutments and sometimes piers. A truss bridge also has _____ sections across the deck that will carry different forces (_____ and _____) ultimately to the ends (abutments). This spreads out the force across the deck, making the bridge stronger.

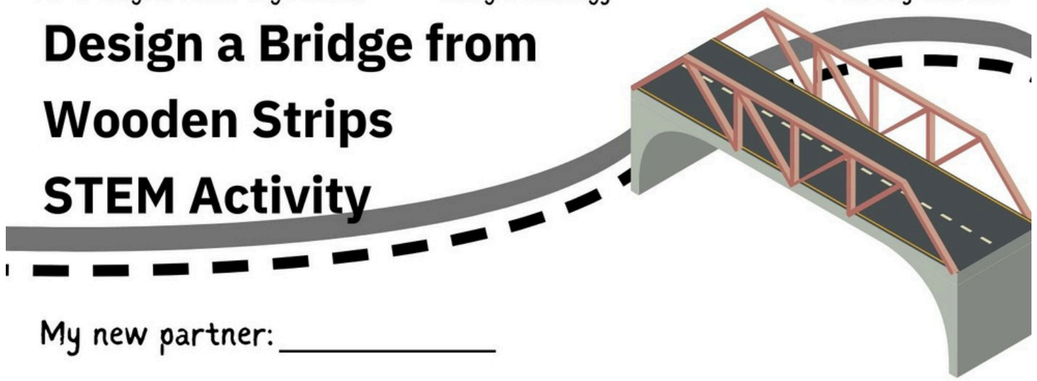




_____

There are different variations of arch bridges, but they all have the same basic structure. There is an arch resting on two abutments. When weight is exerted down on the bridge, the force/stress is distributed, compressing across and down the arch. The arch is always in compression and that makes it really _____.

Design a Bridge from Wooden Strips STEM Activity



My new partner: _____

Your challenge is to make a bridge using only **wood strips**, binder clips and **glue**. A bridge will be tested by hanging a **10x10 cm load**, **lifting jack** or **pulling force** under it using string and a uniform item, such as paper clips or coins, will be added to test the strength of your design.

Start by discussing with your group how you plan to use the materials to make your bridge, then begin drawing and writing instructions using the worksheet below. Using the kit provided design and build a bridge which **spans a 60cm gap**. Once your design is completed and it has been approved by your teacher, you may need to change or adapt your design to make sure your bridge stands and holds the set weight.

You Will Need:

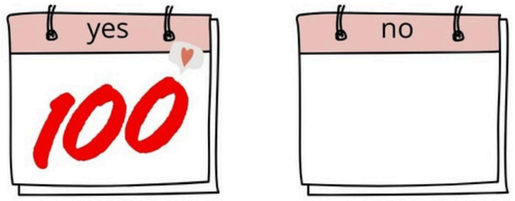
- mix of wood strips
- **diagonal pliers**
- **wood glue**
- **binder clips**
- weights (load, pulling force, etc)

Don't forget to record how much weight your bridge held. Teacher Una may like to tally and graph this data as a whole class.

112-2 QingPu Junior High School Living Technology Made by Una Hsu

BRIDGE *challenge*

Test your design. Did it hold the weight of **50 kilograms**? Make modifications if required.



Rate your design:

What did you like about your design?

_____

_____

_____

What would you do to improve it next time?

_____

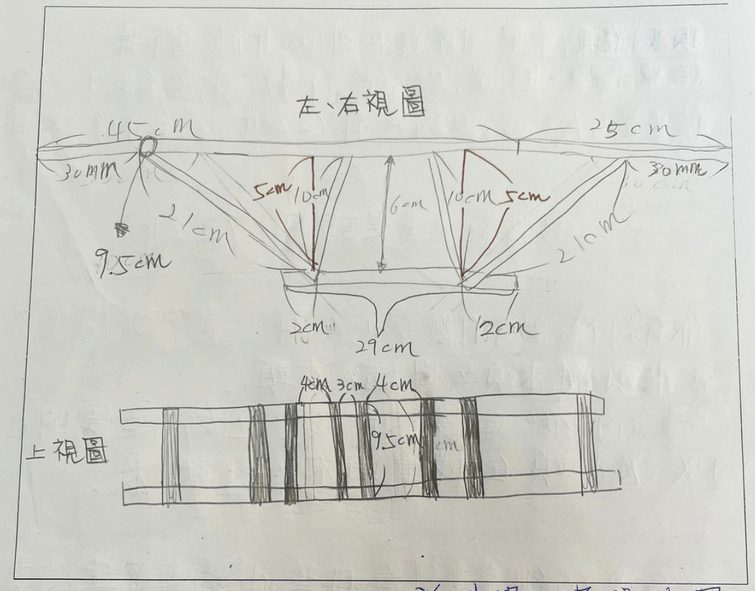
_____

_____

7059 陳宥驛

Design Space

In the space below, draw, label and write how you plan to make your bridge. This may include the names of the different types of wood strips you are going to use, how you hold the wood strips together and where you plan on hanging the weight.



Steps

Fill in the steps you took to build your bridge below:

工作日誌

3/1：我們先畫設計圖。

3/4、3/11：3/4：我們選擇Warren(桁架橋)

3/25：並未完成第一個「左右視圖」，但已在切木棒了。

4/1：我們做好了第一個「左右視圖」，並在45cm木棒上做記號。

4/8：我們做好2個「左右視圖」，並規畫下一次要怎麼做

4/15、4/22 測試日 4/22：我們今天測試，結果為可載重7.2公斤」。

4/15：完成左右視圖，並拿9.5cm的短棒將它們接在一起。

Prediction

Write a prediction about your bridge. Do you think it will stay standing? Do you think it will hold any weight? If so, how much?

我覺得不會撐很多，因為我沒有很多固。

I think that our bridge will either ~~bro~~ break or fall apart, ~~#~~because it isn't very stable and we waste too much time.

Reflection

How many uniform items or weight did your bridge hold? 6 kg

Did you have to make any changes to your bridge while you were making it? What were they? Why did you have to make them?

我們需要中突需要作非常多改變。

Our plan was change many times, because we have ~~thought~~ seen other classmates brigdes and made some improvements, such as ~~dot~~ layering the ~~sides~~ of the brigde.

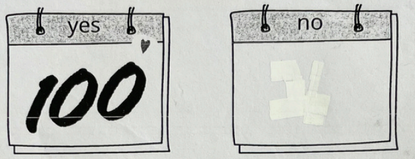
What was something you saw in another group's design that you would have liked to include in your design? Why?

我有看到了有一組時間分配的很好，每節課都有安排要做什麼。我不會想改變我們的設計，但我早知道因應該把時間安排好:)

I wouldn't want to really add anything to our bridge, but I do wish that we had ~~mane~~ manged our time better, cause we didn't end up finishing, and we ~~wern~~ weren't able to get the best score we should have gotten if we had finished.

BRIDGE *challenge*

Test your design. Did it hold the weight of **50 kilograms**? Make modifications if required.



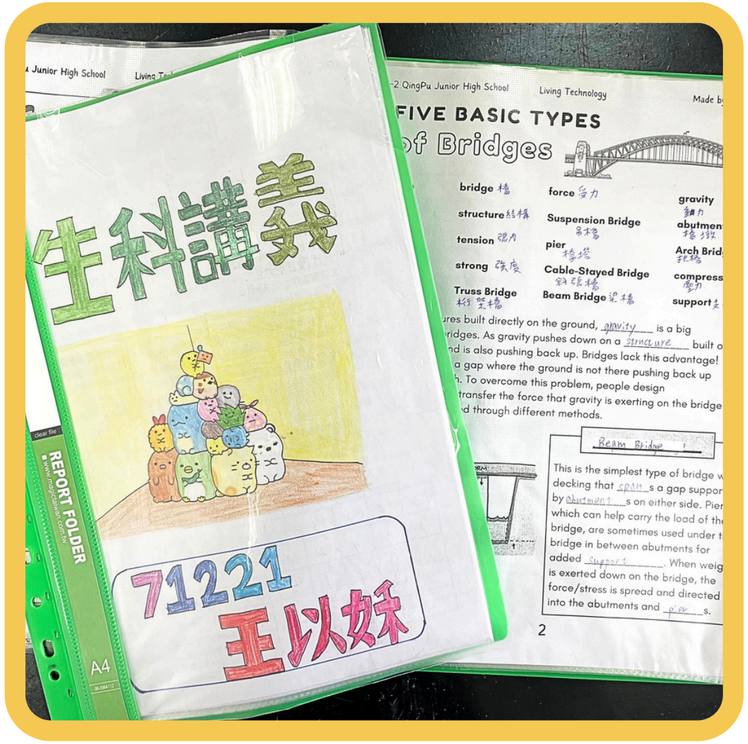
Rate your design:

What did you like about your design?

It was stable for the most part but it wasn't glued straight resulted in bending, and I liked that we had a few sticks left after finished building it was also just a dope bridge in general.

What would you do to improve it next time?

Make sure the lines are straight and glued together proprely.



Multimodalities-Entextualization Cycle (MEC)

a curriculum genre to inform curriculum planners and teachers

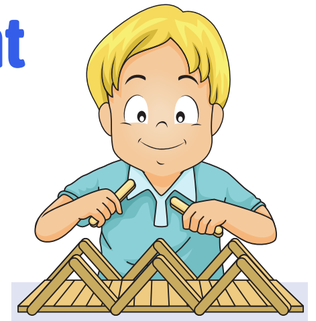
Lin, A. M. Y. (2016). *Language across the curriculum and CLIL in English-as-an- additional-language contexts: Theory and practice*. Dordrecht: Springer.

Designing parallel tasks

- tasks that are similar in terms of content and linguistic demands, but with some meaningful variation
- teacher demonstrates how to produce a text in a given genre, and then engages students in guided writing (co-constructing a text with students)

Lin, A. M. Y. (2016). *Language across the curriculum and CLIL in English-as-an- additional-language contexts: Theory and practice*. Dordrecht: Springer.

Scaffolding students to attempt tasks

Parallel Tasks	Task 1	Task 2
	Electric Circuits: Identify differences between series and parallel circuits.	**Circuits creator:** Create a circuit diagram and do the experiment.
Repetition with variation	Teacher does the first task **with students (joint construction)** 	Students are asked to attempt the second task **on their own (i.e. independent construction)** 

Integrate CLIL tasks into school syllabuses (e.g. in the Taiwan school curriculum)

設計思考（設）		設 a-V-3	能不受性別限制主動關注並參與生活中的科技議題。
	日常科技的操作技能（s）	設 s-V-1	能運用繪圖軟體或相關科技以表達設計構想。
		設 s-V-2	能有效活用材料、工具並進行精確加工處理。
		設 s-V-3	能運用科技工具維修及調校科技產品。

Intended learning outcomes

English (language) learning objectives:

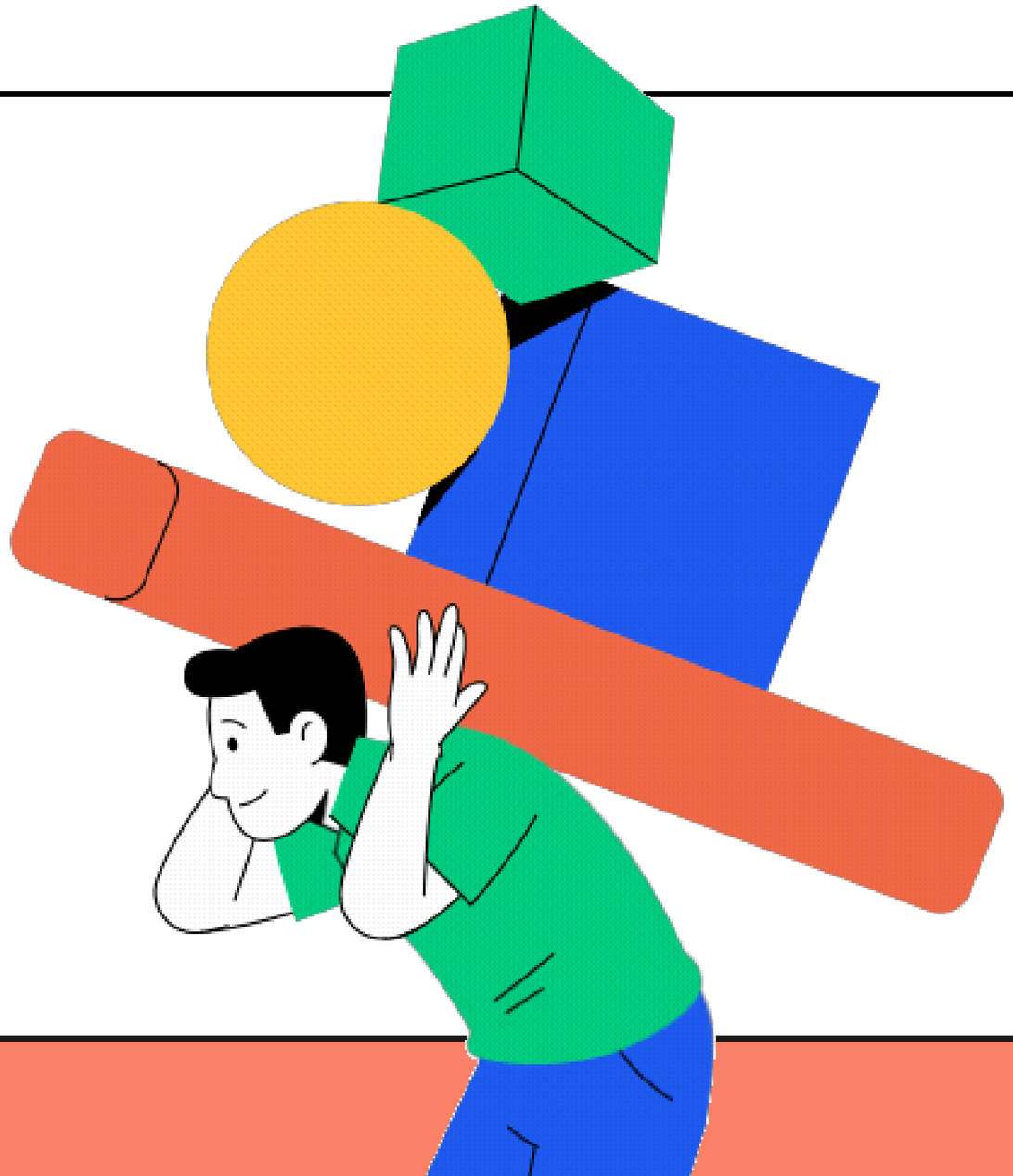
1. Identify and name some components
2. Provide reasons (using the linking word “because”)

Electric circuits (content) learning objectives:

1. Identify components and their functions
2. Determine whether a circuit is series or parallel
3. Create a electric circuit reflecting series or parallel

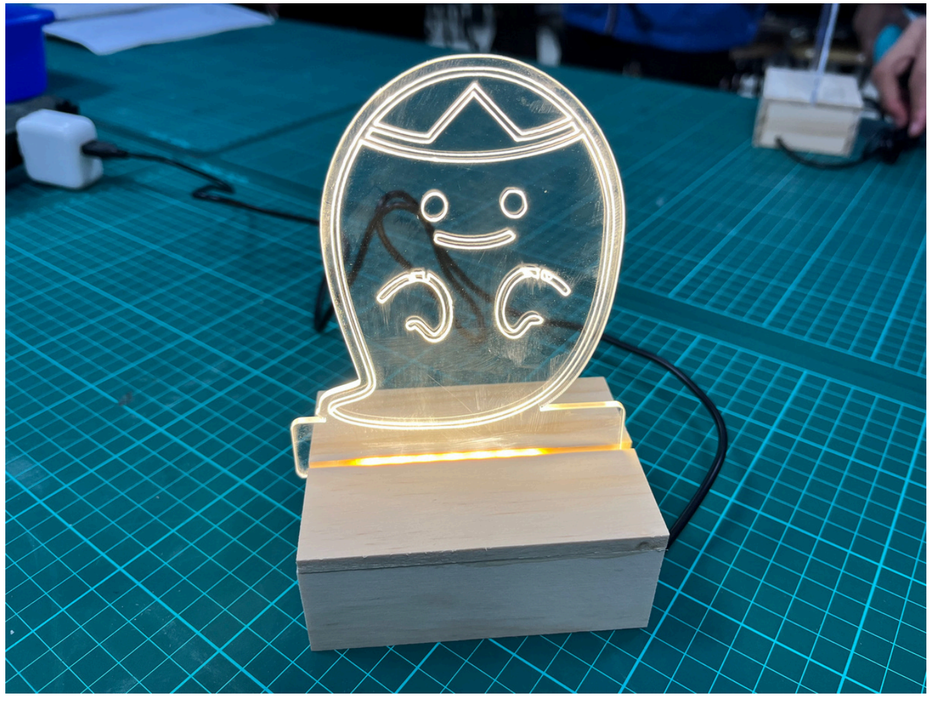
Target

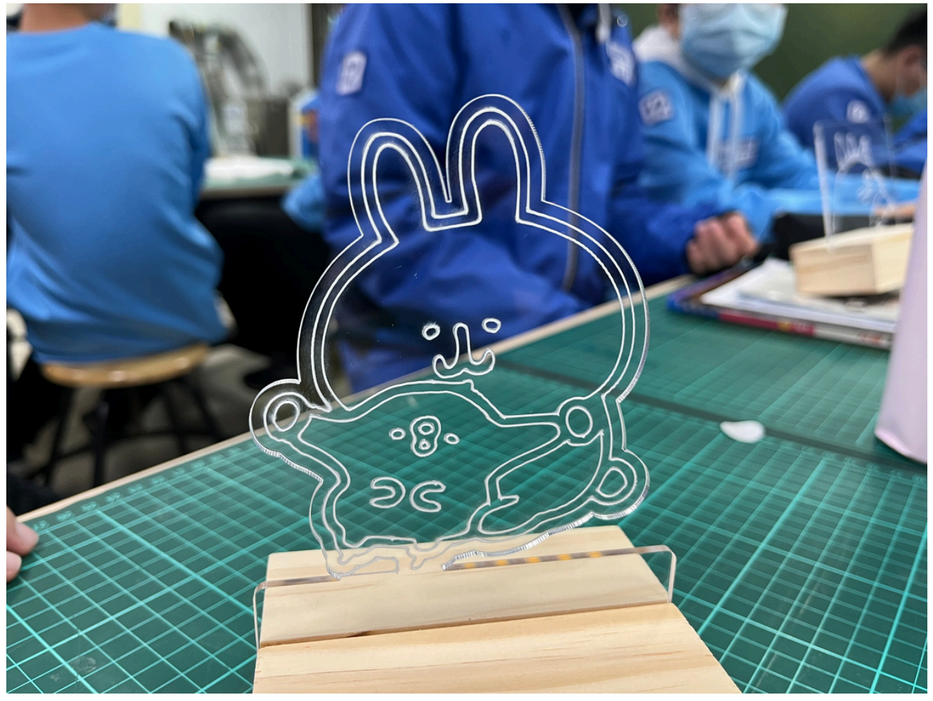
- vocabulary: wire, switch, LED, battery, resistor, electrical, component, series, parallel, electric, circuit, positive, negative, node, flow
- sentence patterns:
  - S + V + O because S + is/are + [ADJ]
  - S + V + O because S + V + O
- genre: a descriptive report

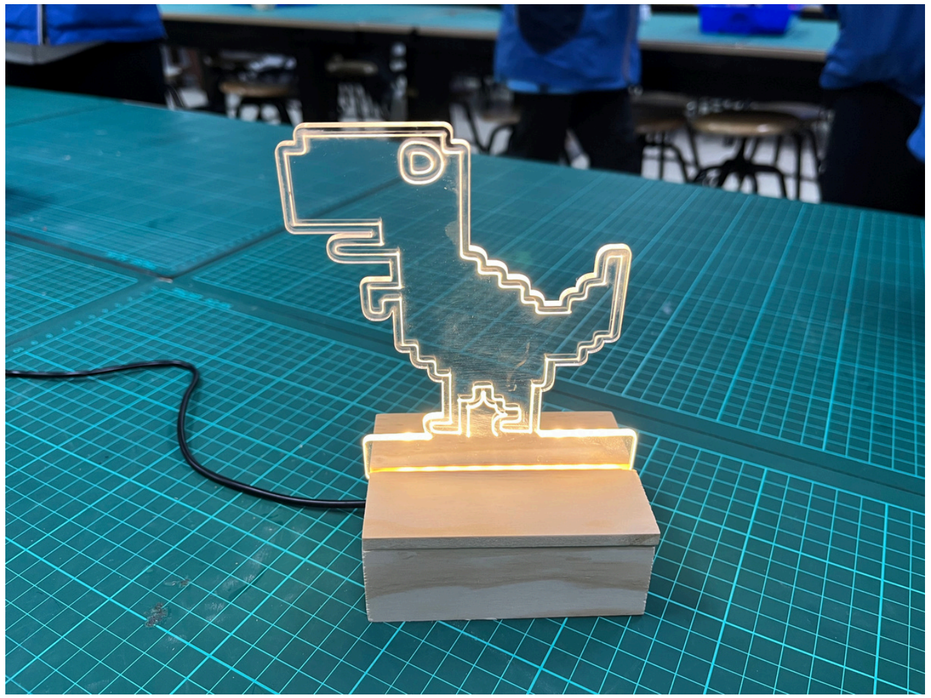


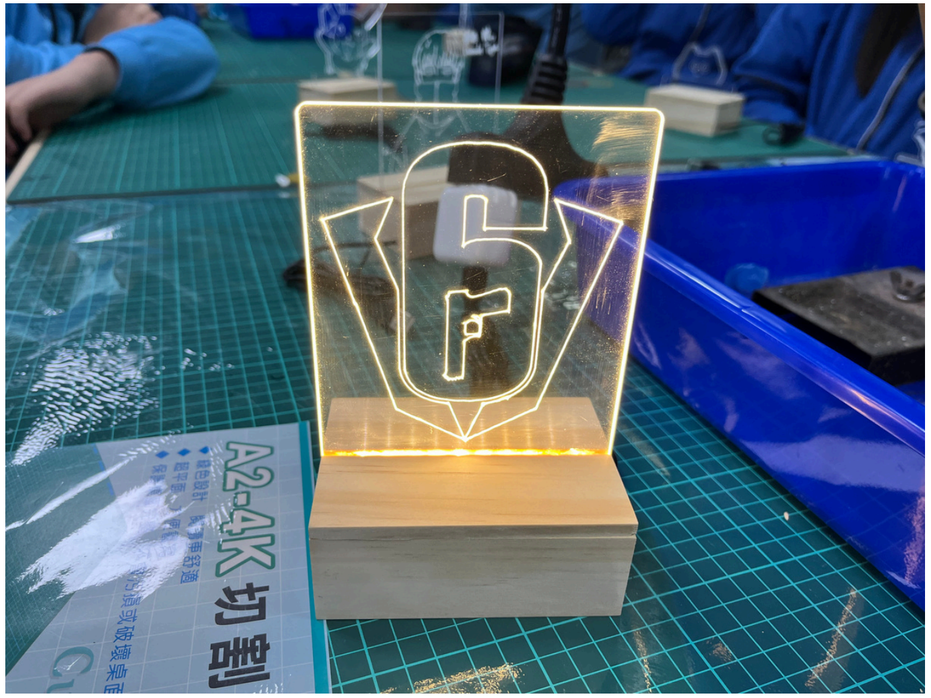
HANDS-ON
LEARNING ACTIVITY

孫維新教授 惠存
金門縣立烈嶼國民中學 敬贈
金門縣立烈嶼國民中學
KINMEN COUNTY LIEYU JUNIOR HIGH SCHOOL 敬贈



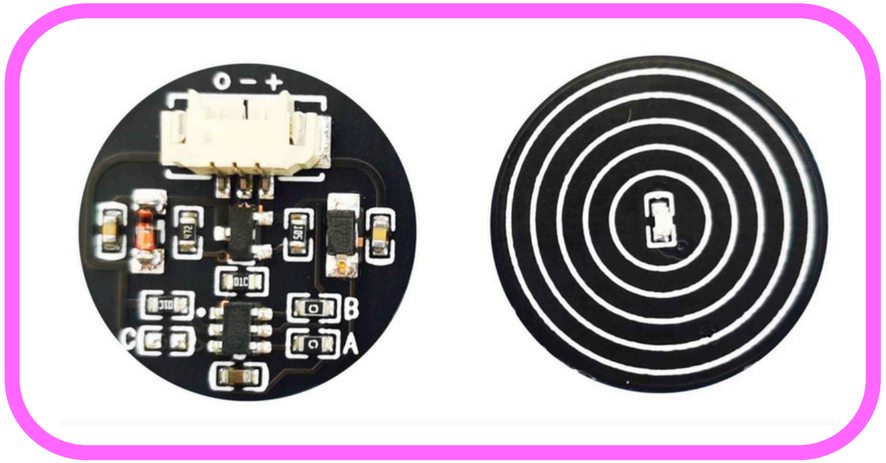


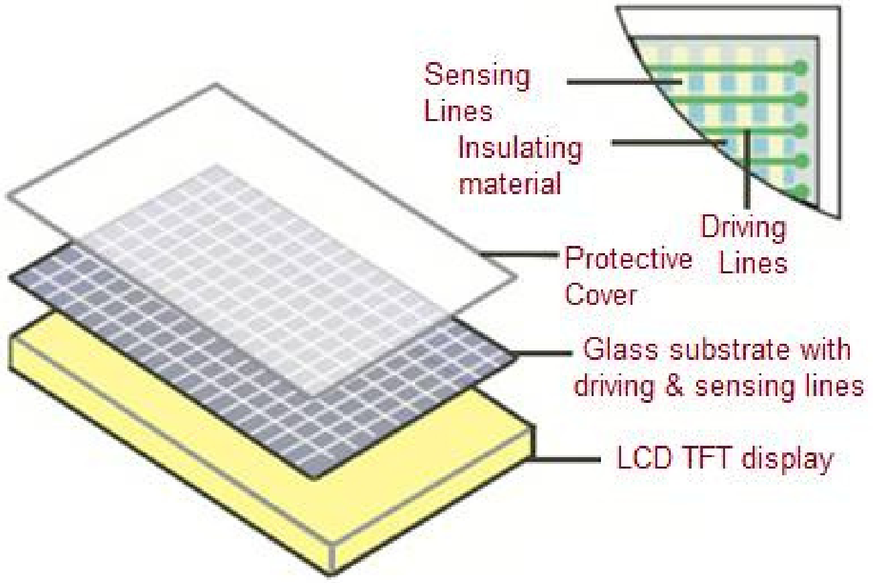



A2-4K 切割

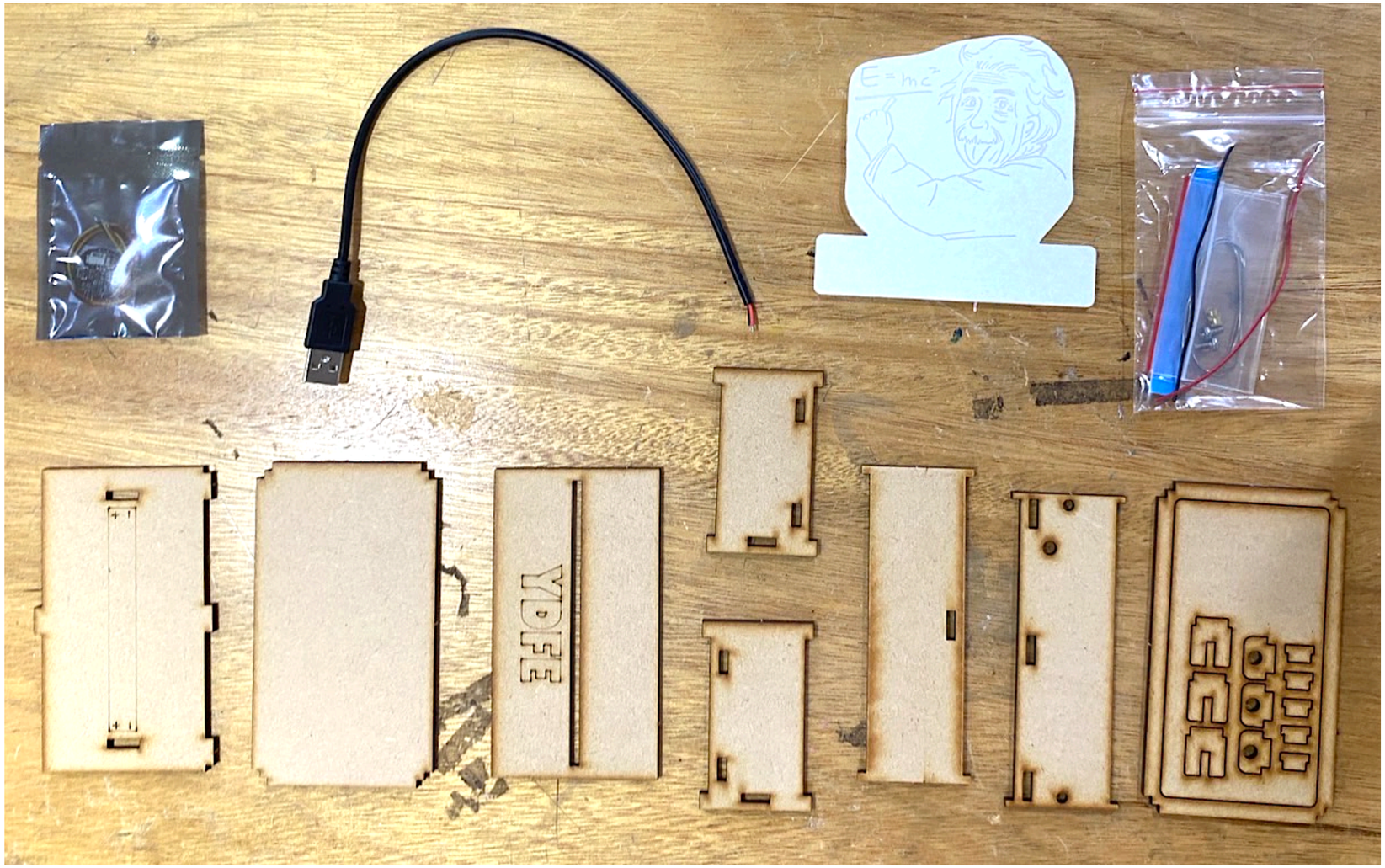
電容觸控式開關

- 由兩層物質疊合而成
  (表面是絕緣層和下層是透明導電層)
- 利用電容開關表面所產生的靜電場，人體靠近後會帶走表面部分電荷產生電流，進而驅動內部控制元件觸發電閘

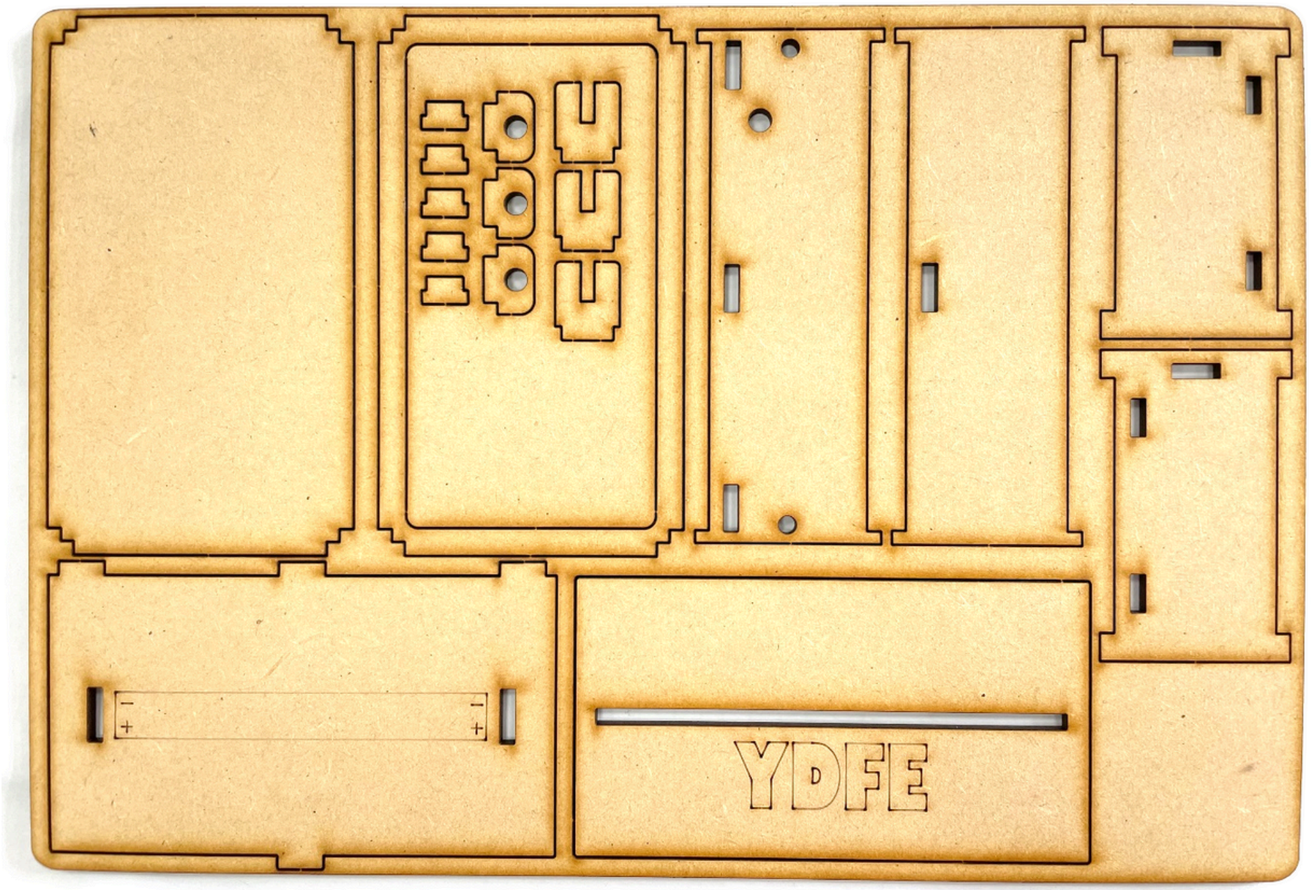


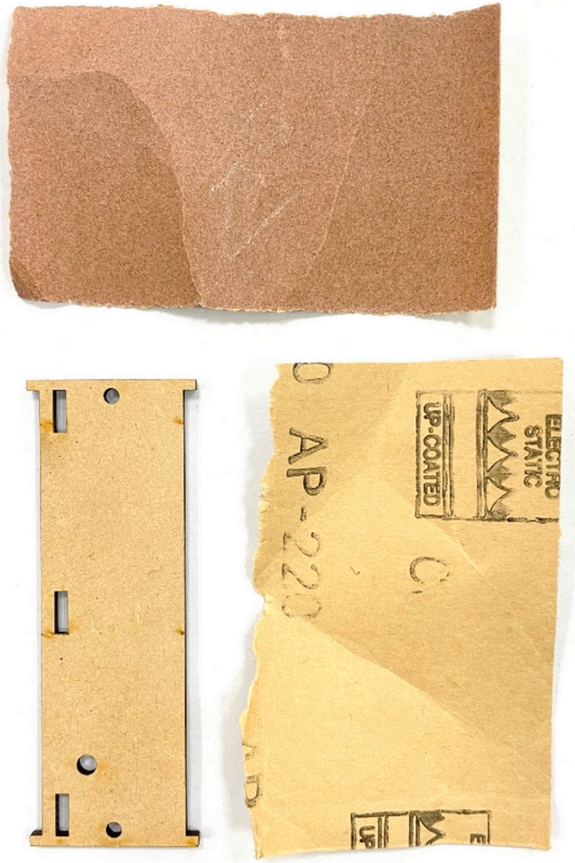


材料清單

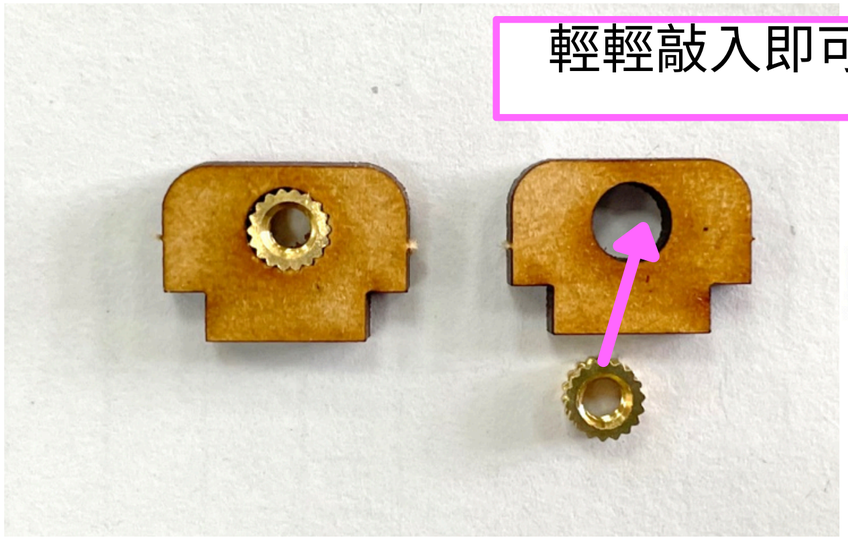


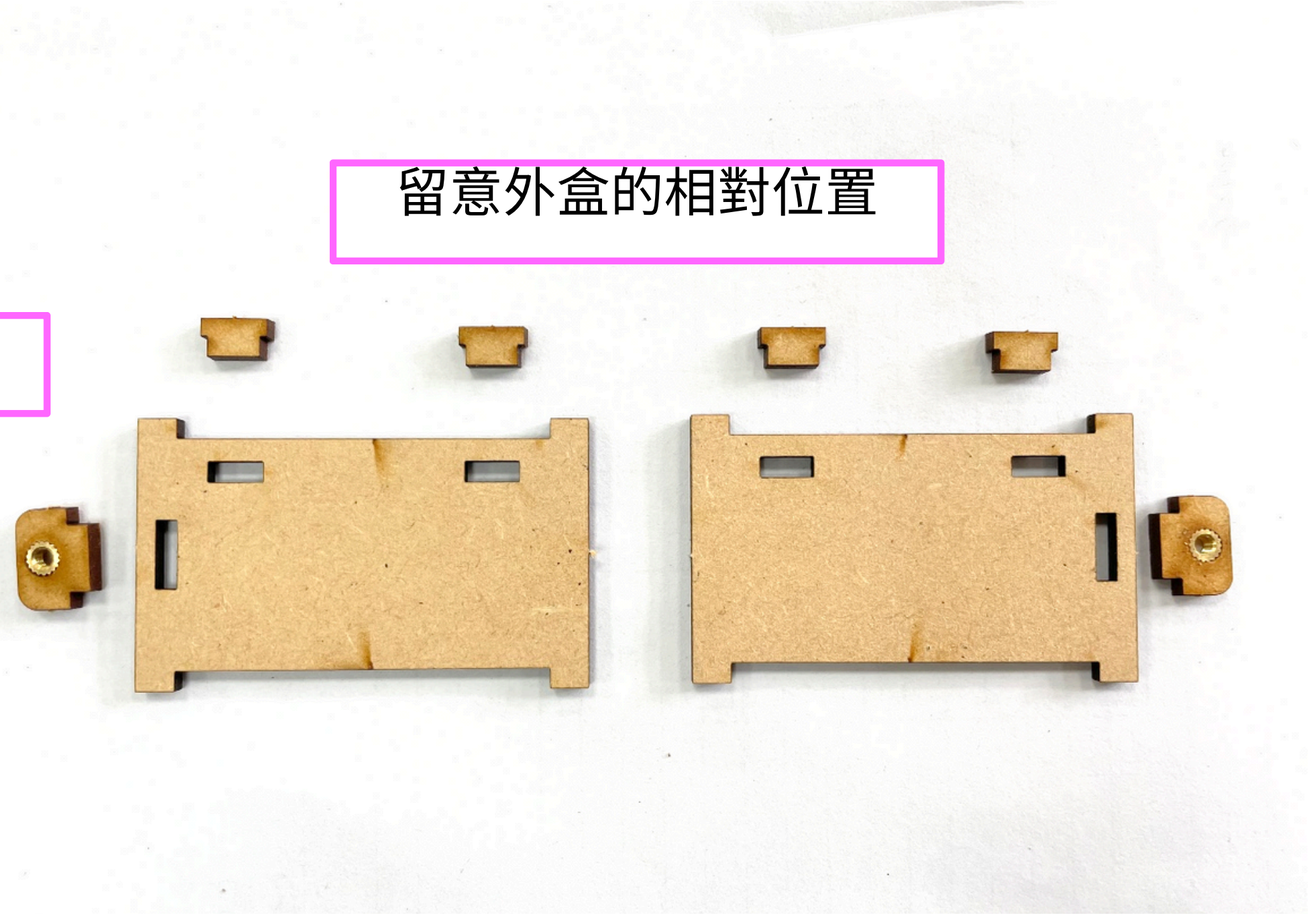
1.利用砂紙砂磨表面與端面



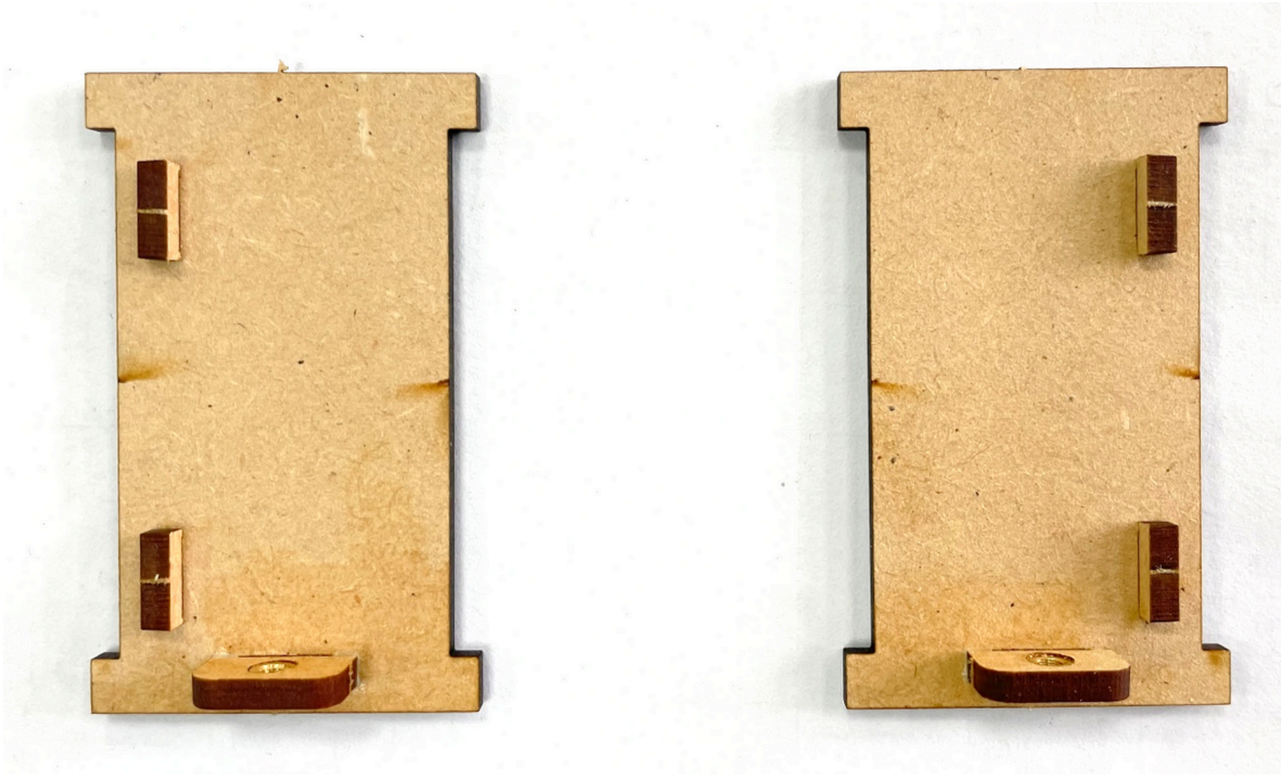


2.使用羊角錘將銅花螺母敲入卡榫內





3.將卡榫黏在左右燈盒上(殘膠用濕布擦拭)

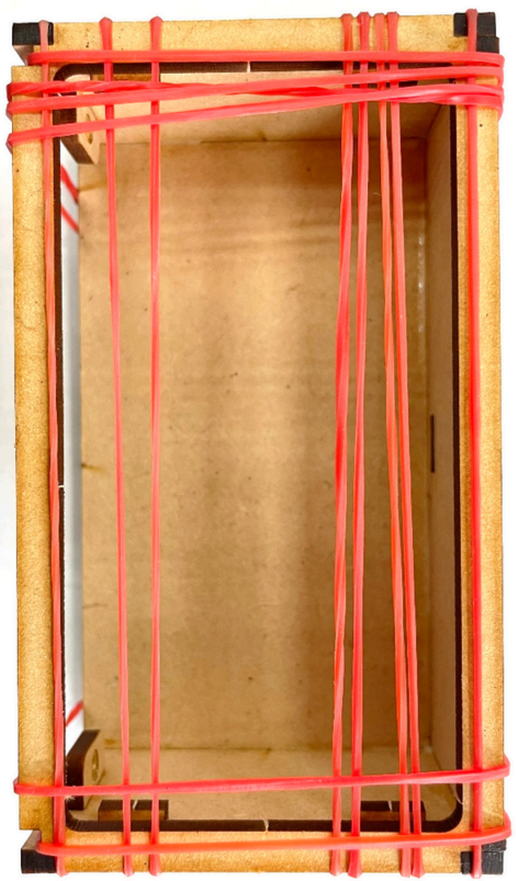


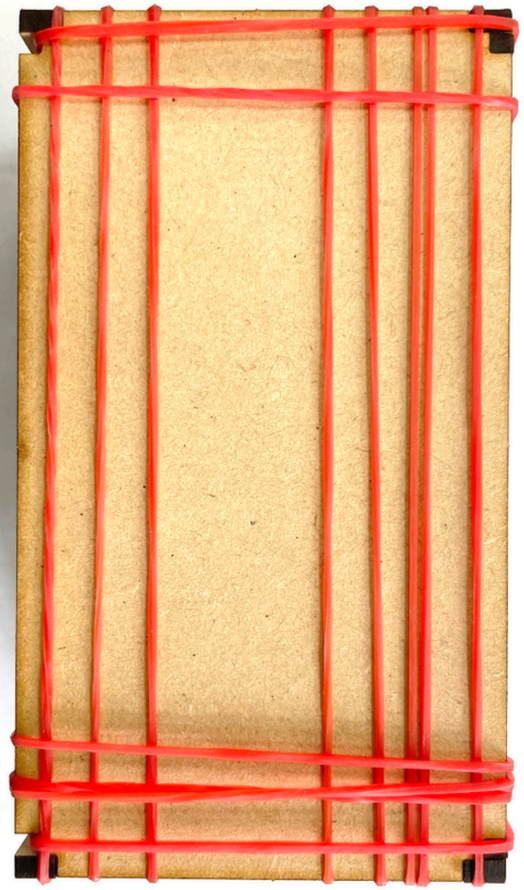
4.使用木工膠膠合燈盒

5.上膠後輕壓盒蓋

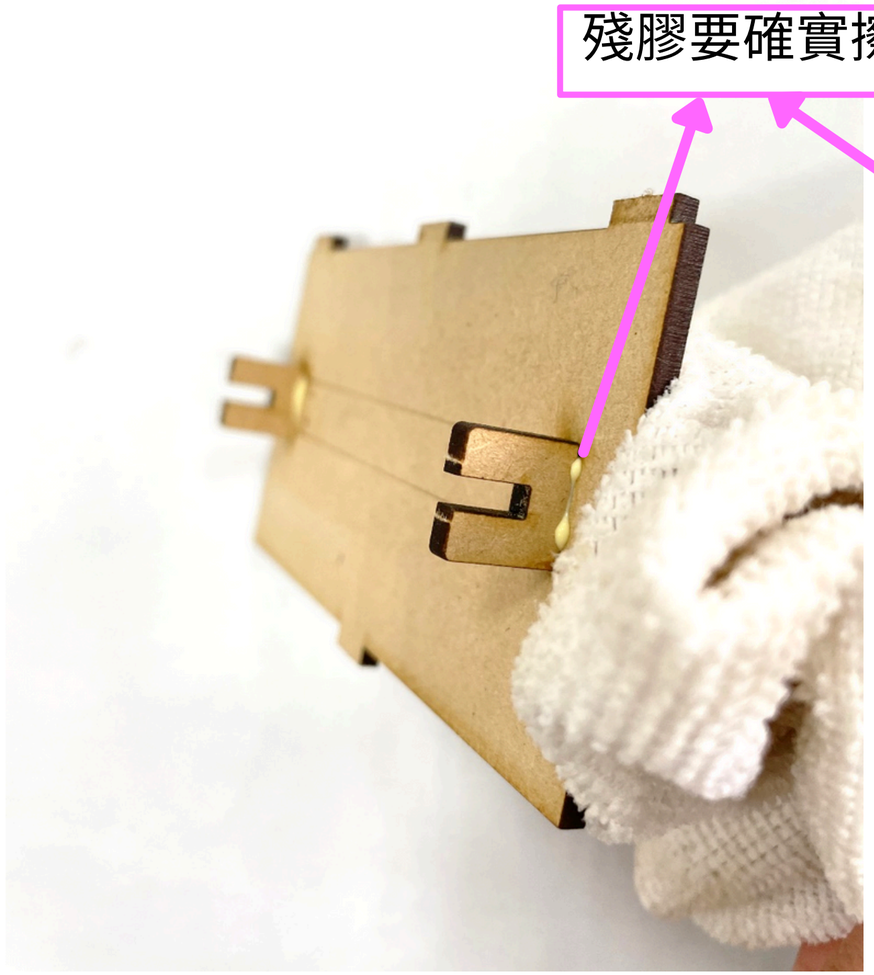
殘膠要確實擦拭

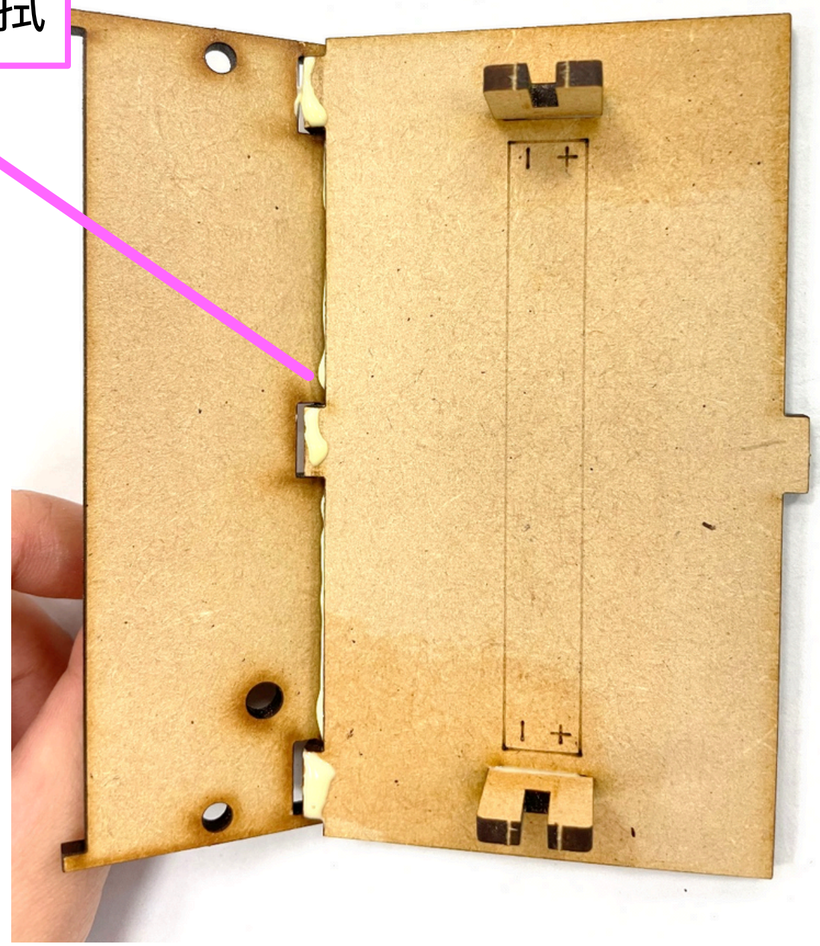
6.可使用橡皮筋暫時加壓固定



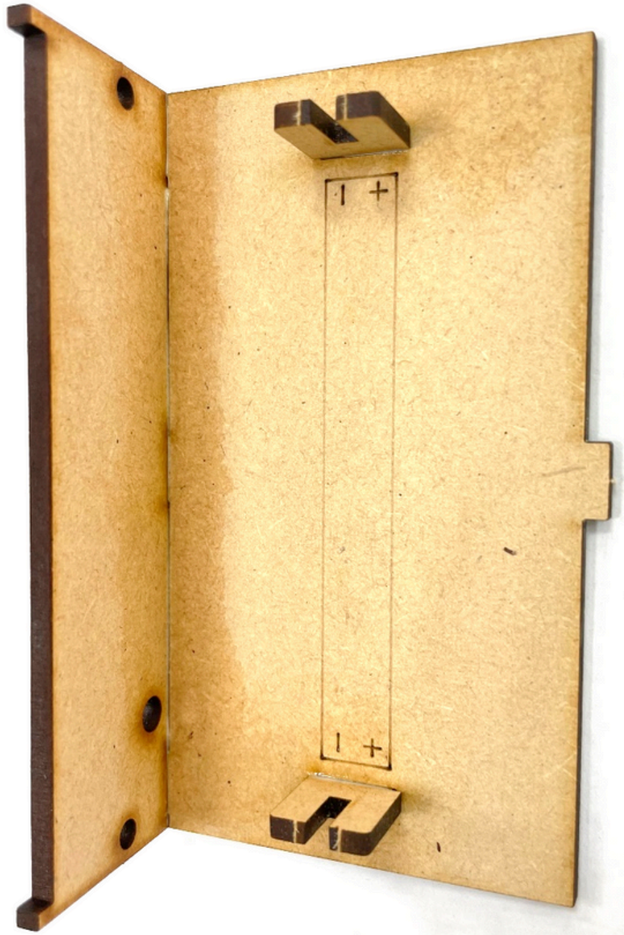


7.膠合燈條座

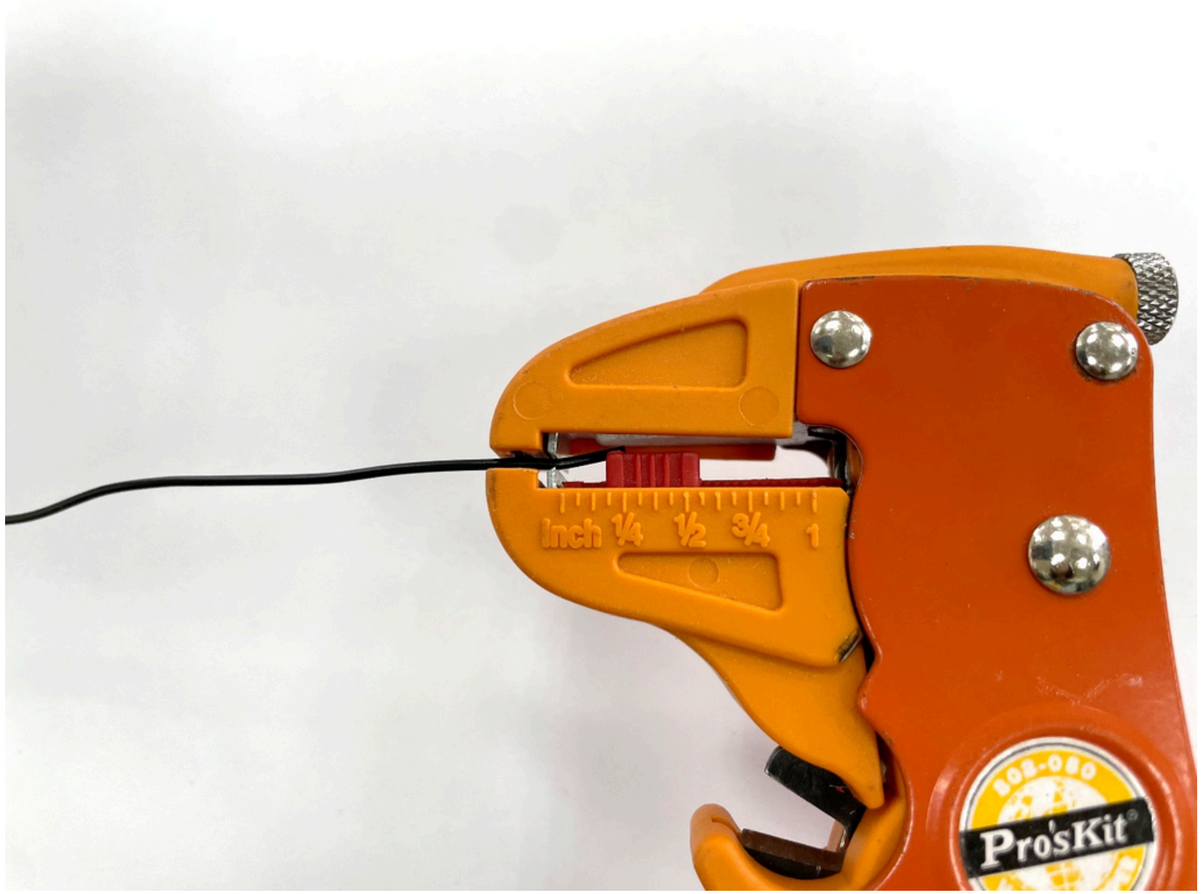


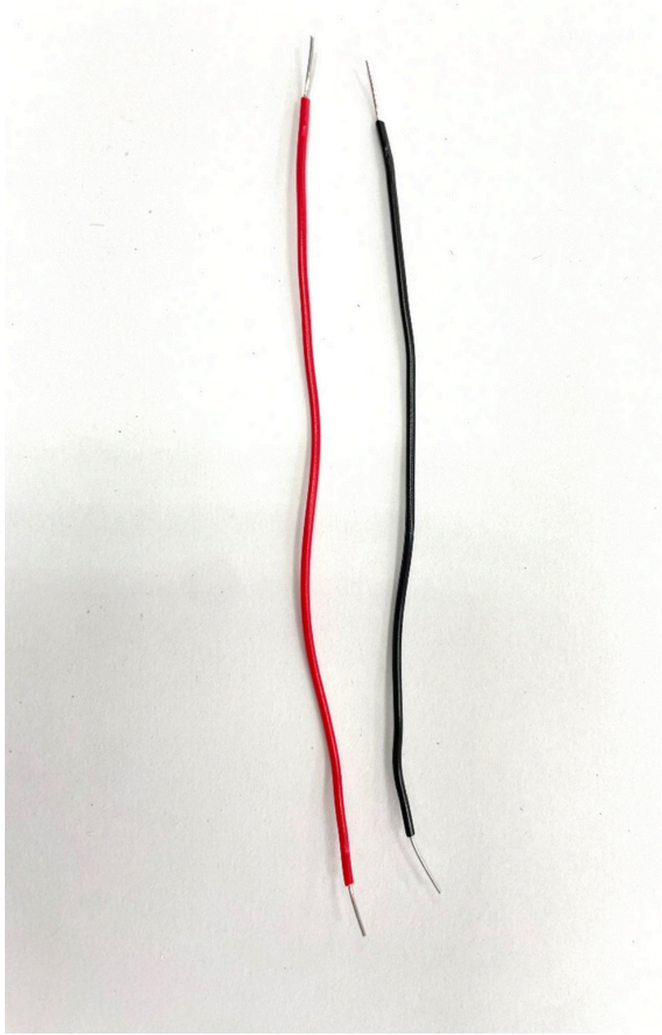


8.燈盒製作完畢(留待實作)

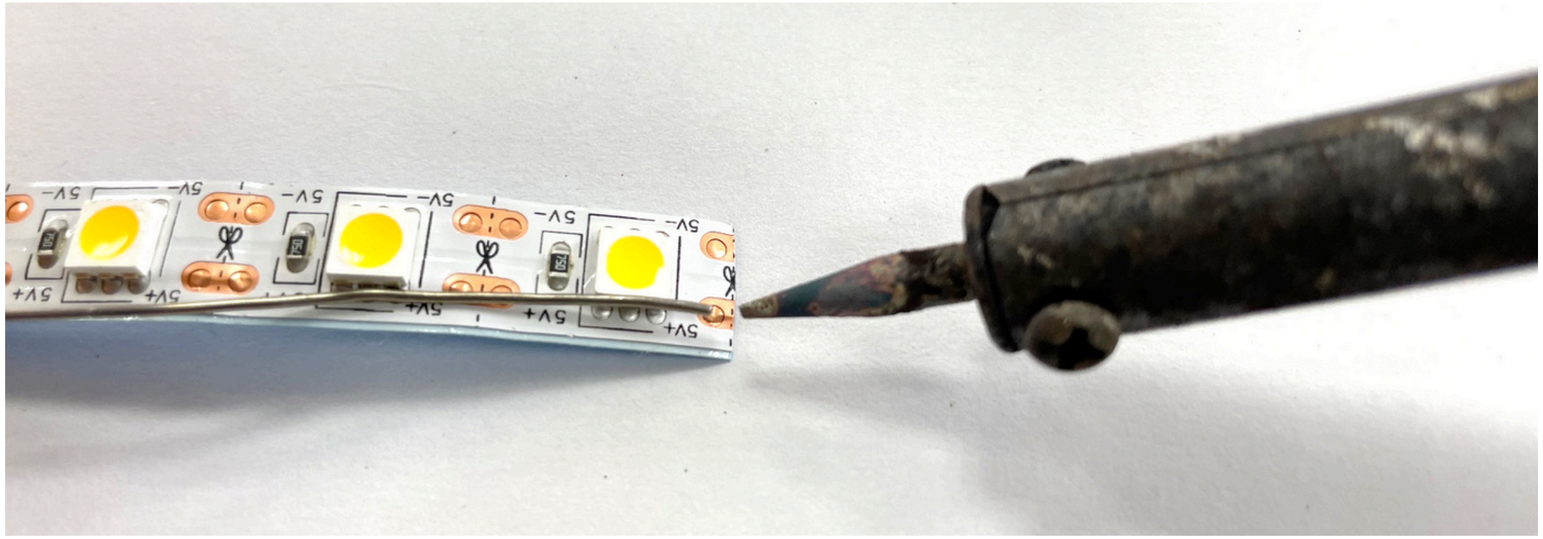


9.使用剝線鉗將導線前後剝線

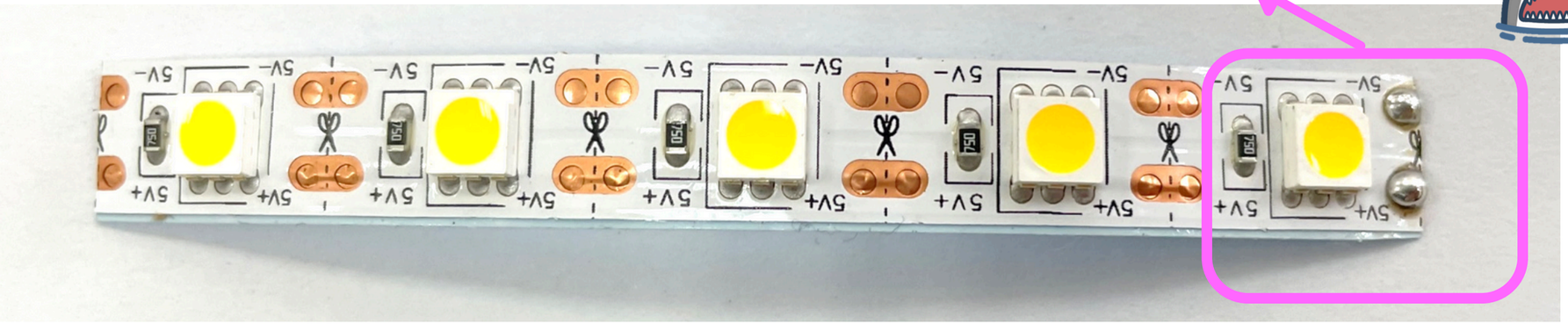




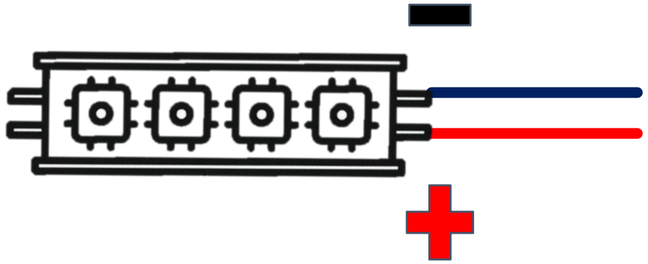
10.先將銲錫銲一點在燈條上

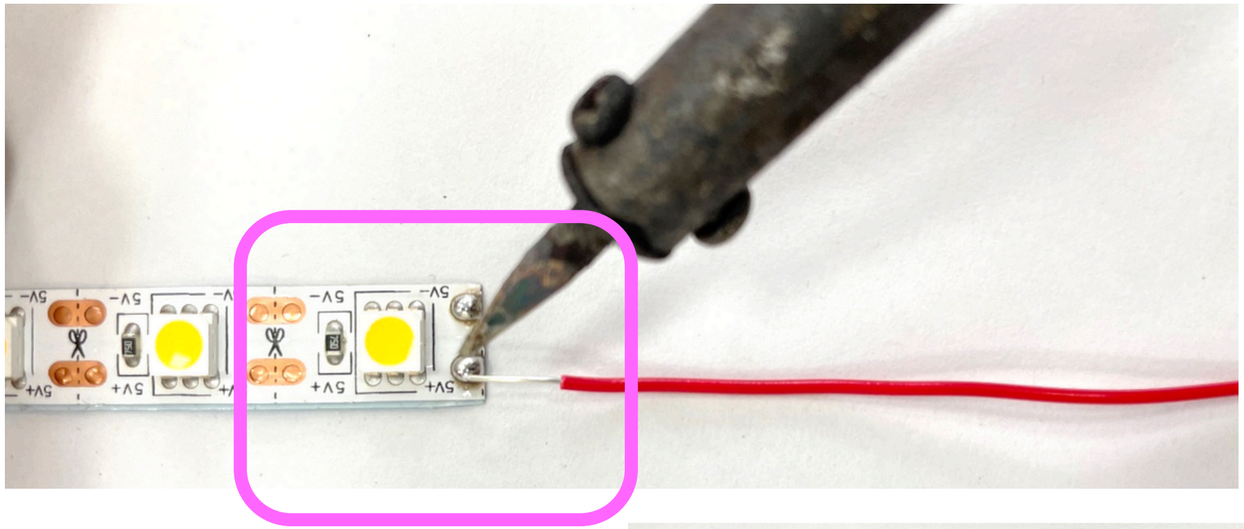


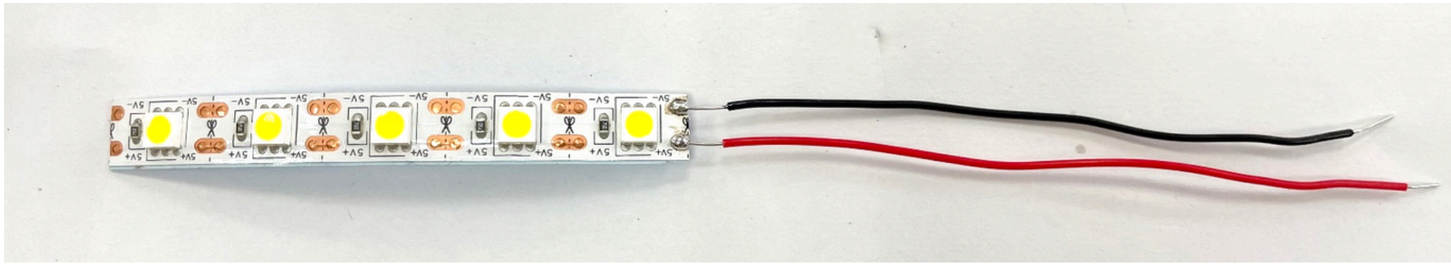
燈條方向一定要正確



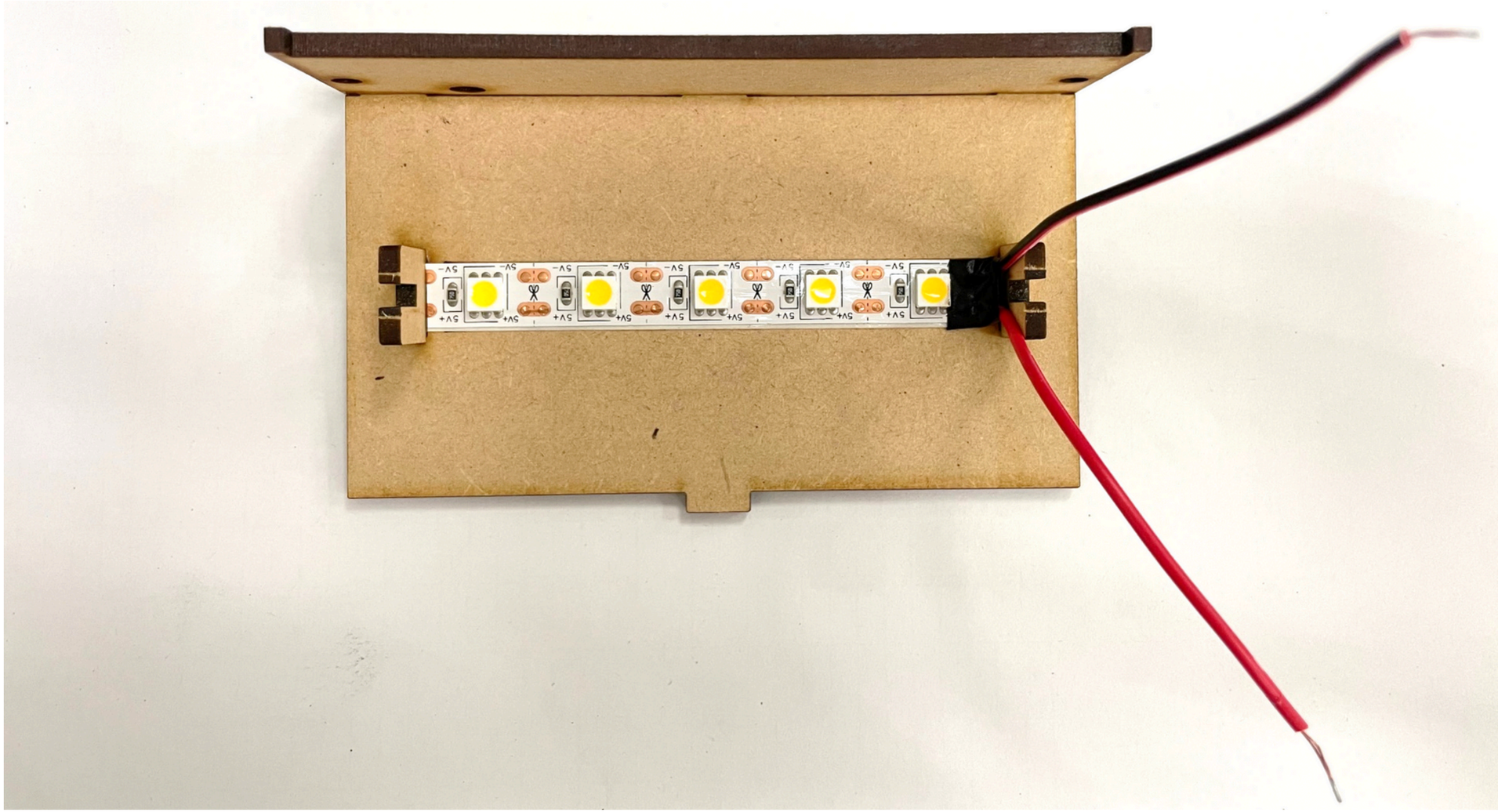
11.銲接燈條與單芯線(用電烙鐵將接頭銲上)



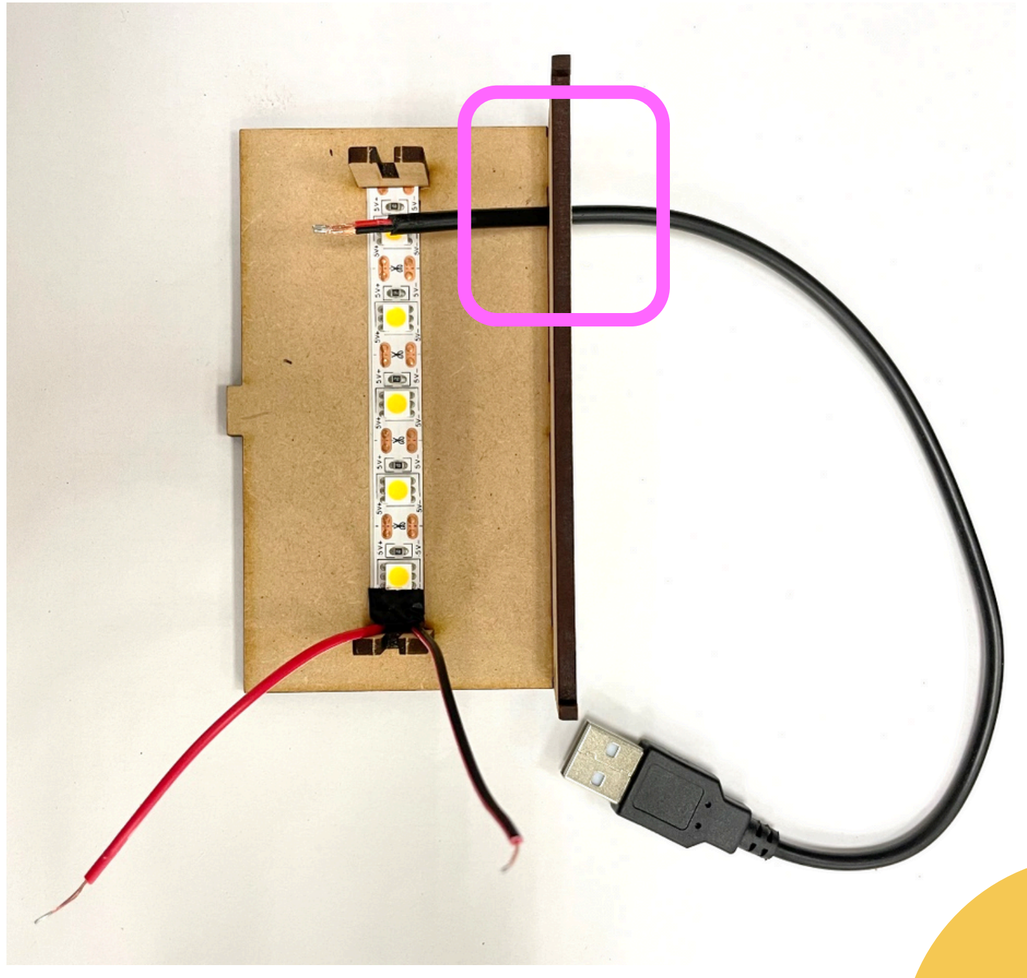




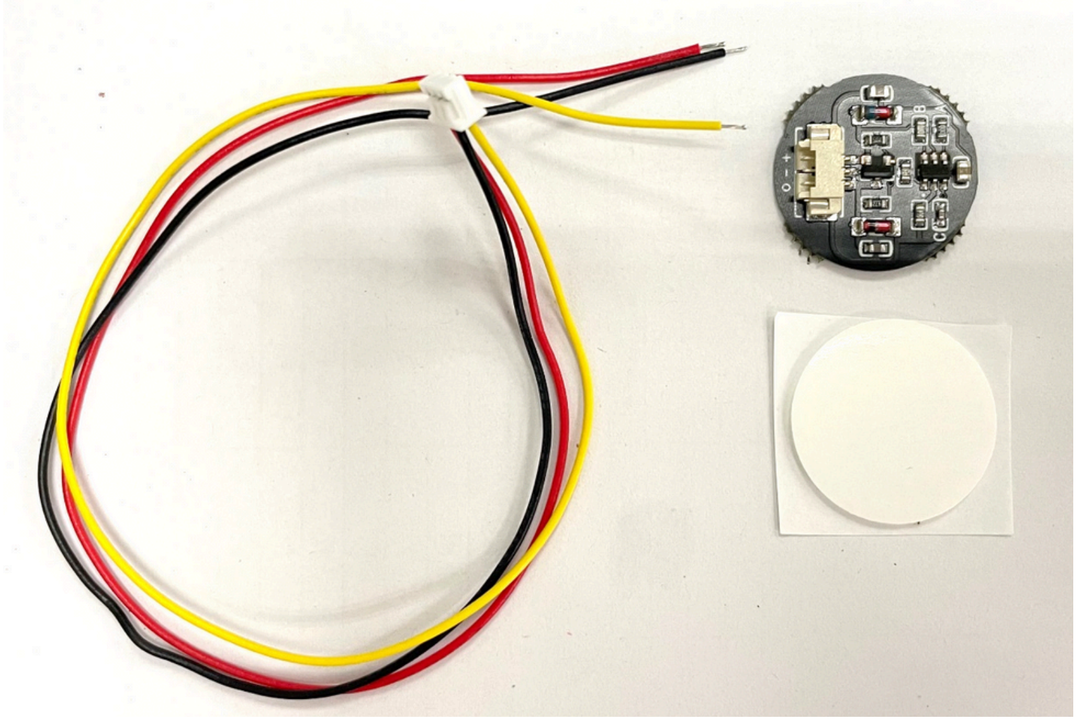
12.撕開燈條背膠黏在燈盒上

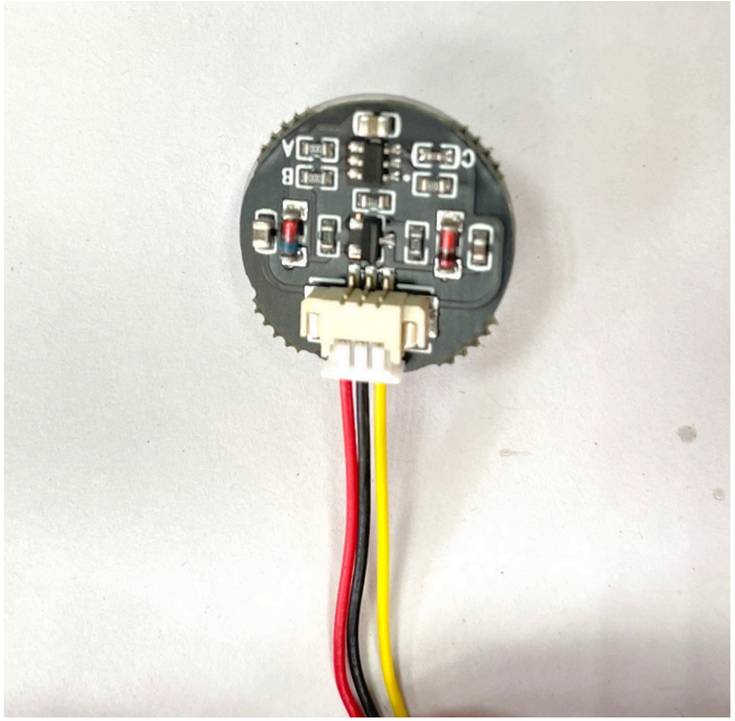


13.USB供電線剝線完後，穿進燈盒孔內

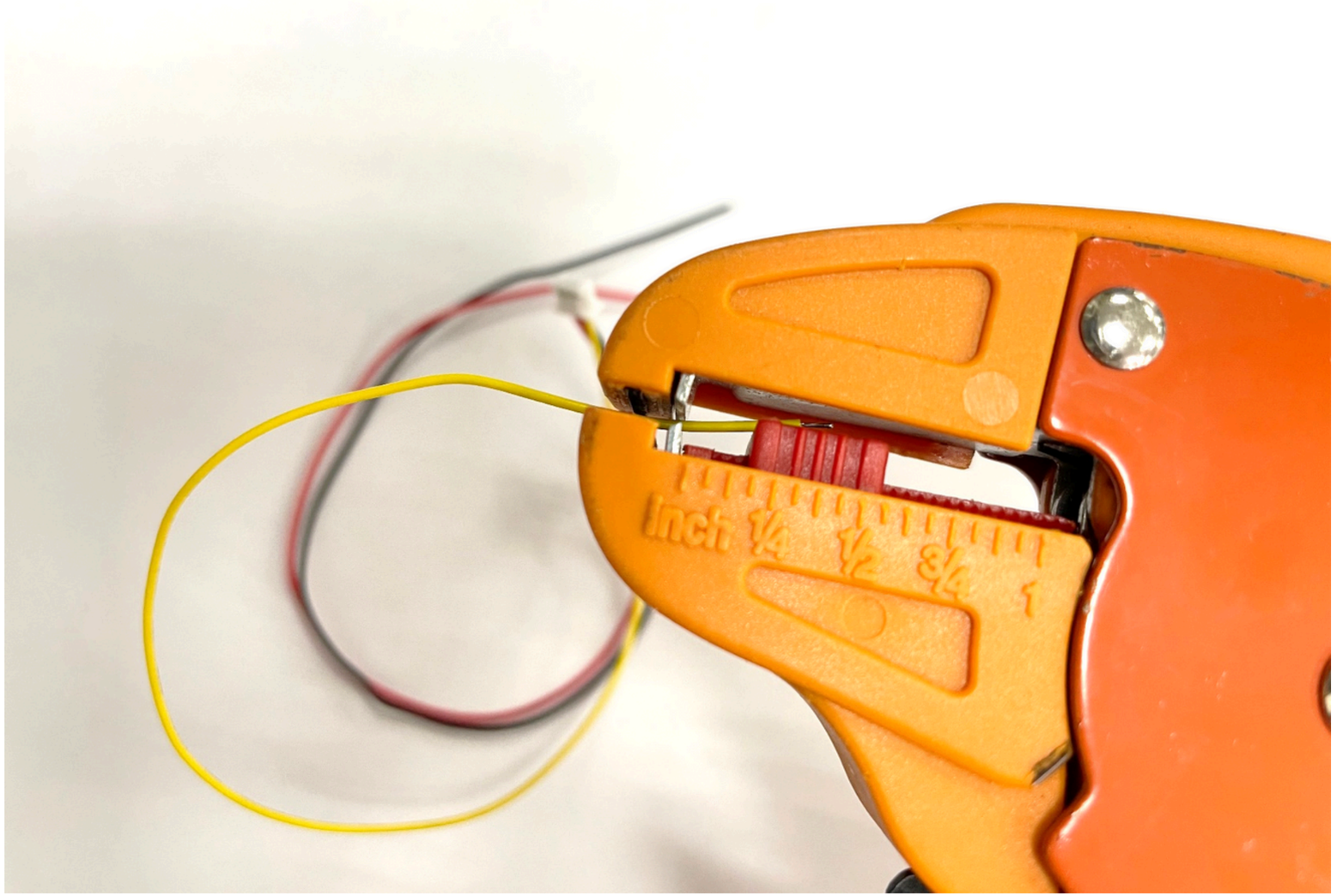


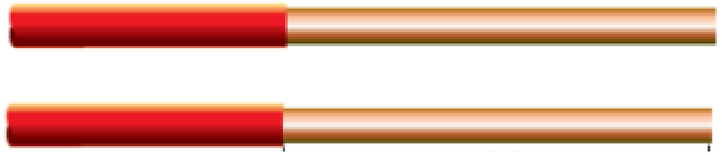
14.將三色導線接上觸控開關並黏上背膠



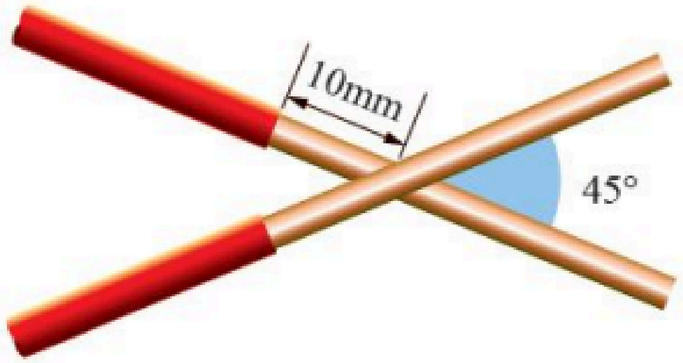


15.使用剝線鉗將觸控開關三條線剝線

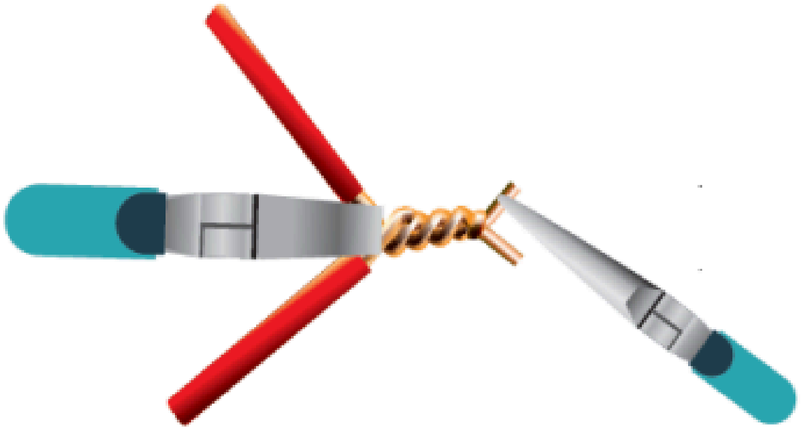




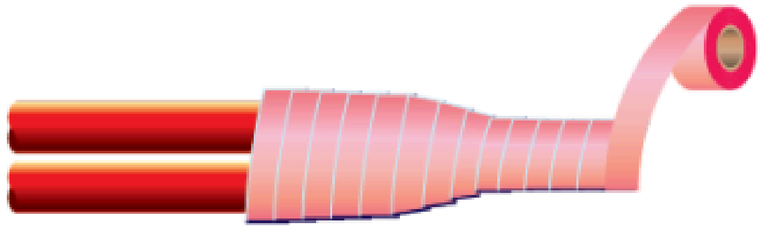
Step 1.剝除絕緣皮



Step 2.捻轉角度

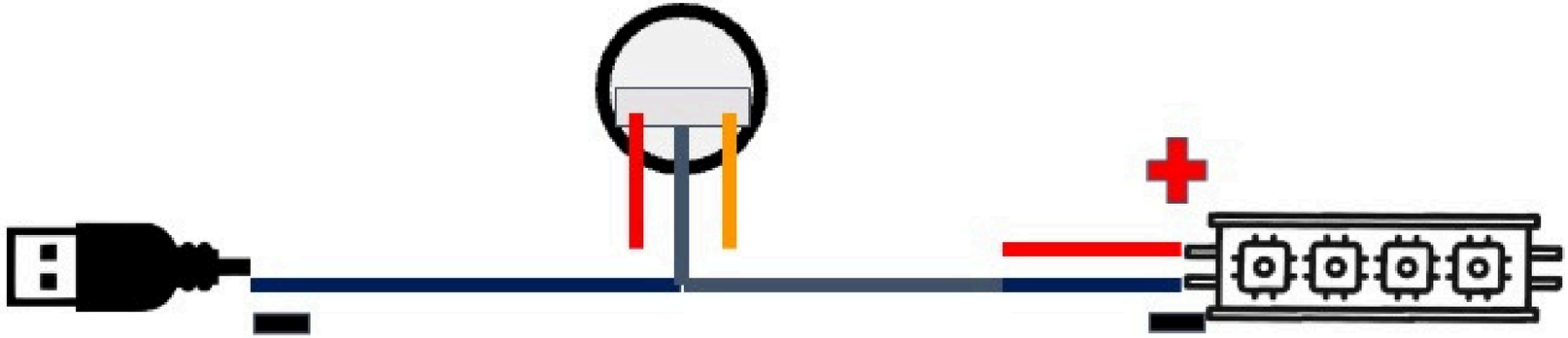


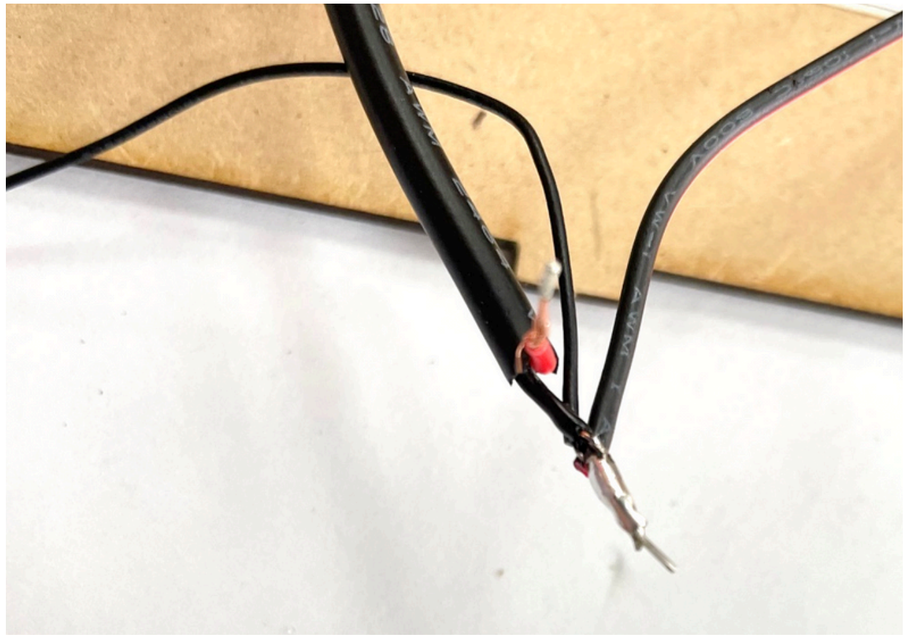
Step 3.一同捲繞

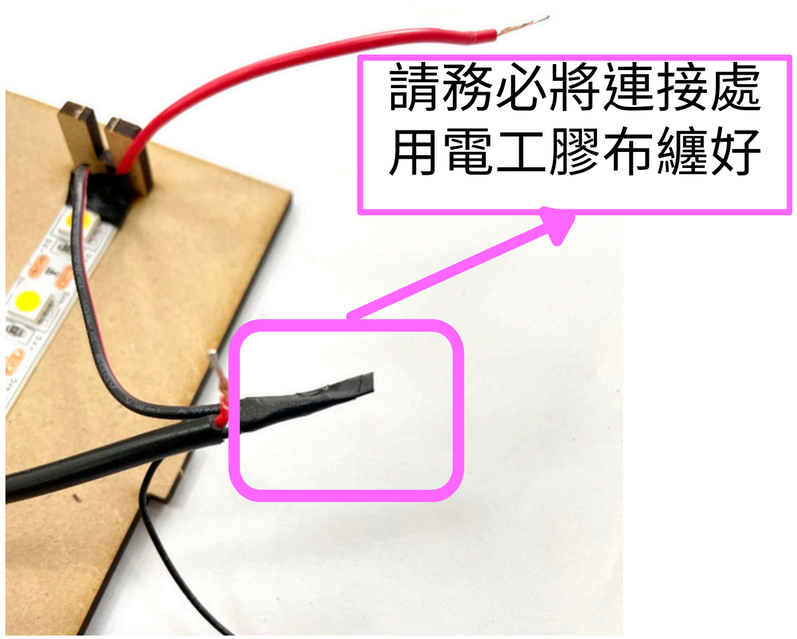


Step 4.纏繞絕緣膠帶

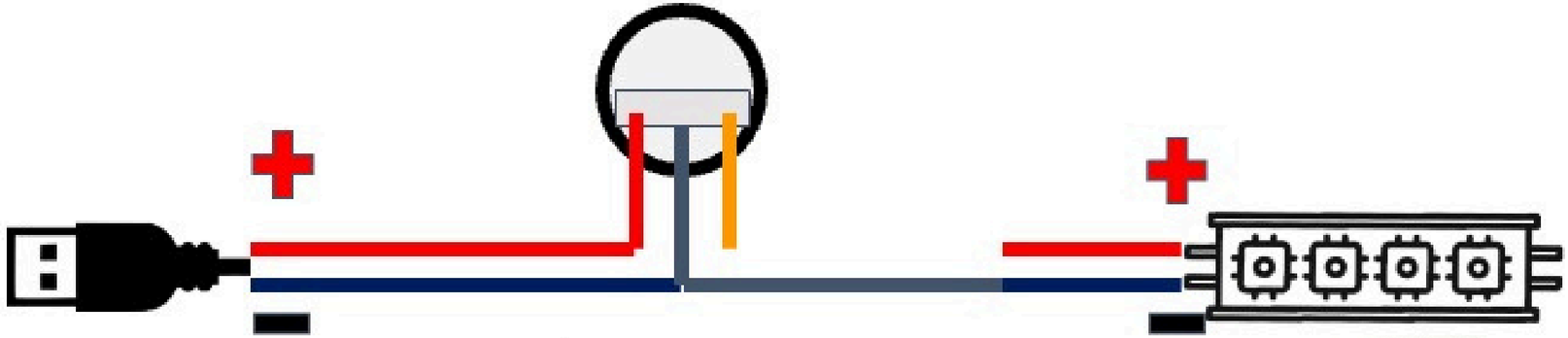
16.觸控開關、USB供電線、燈條負極共線

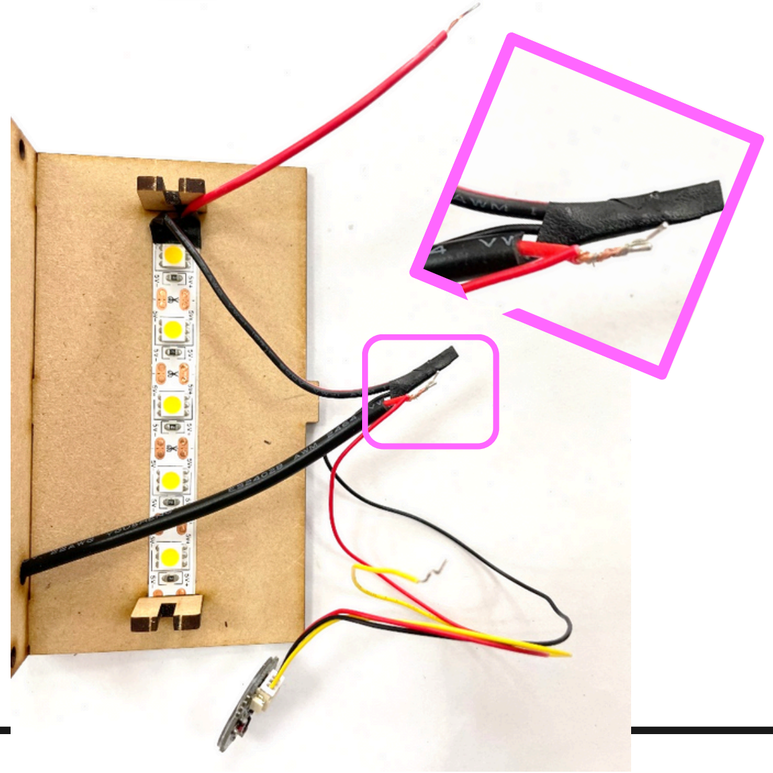


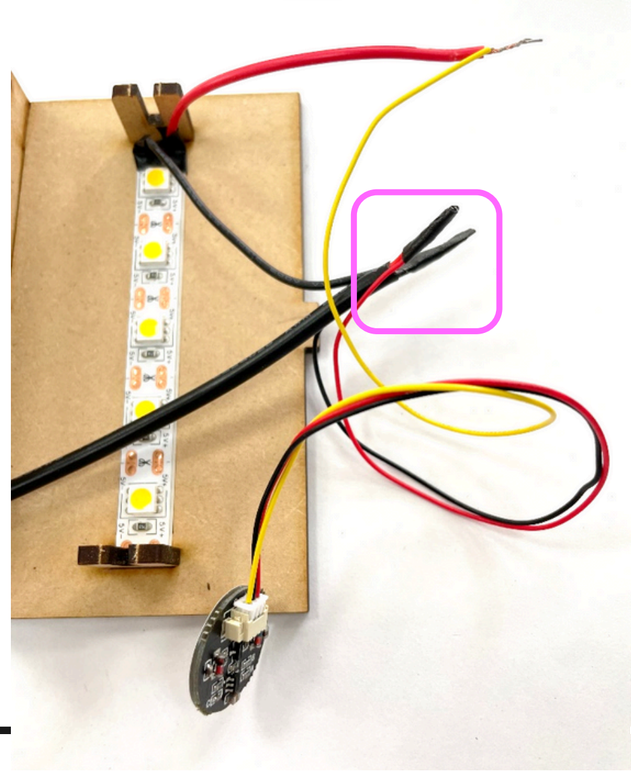




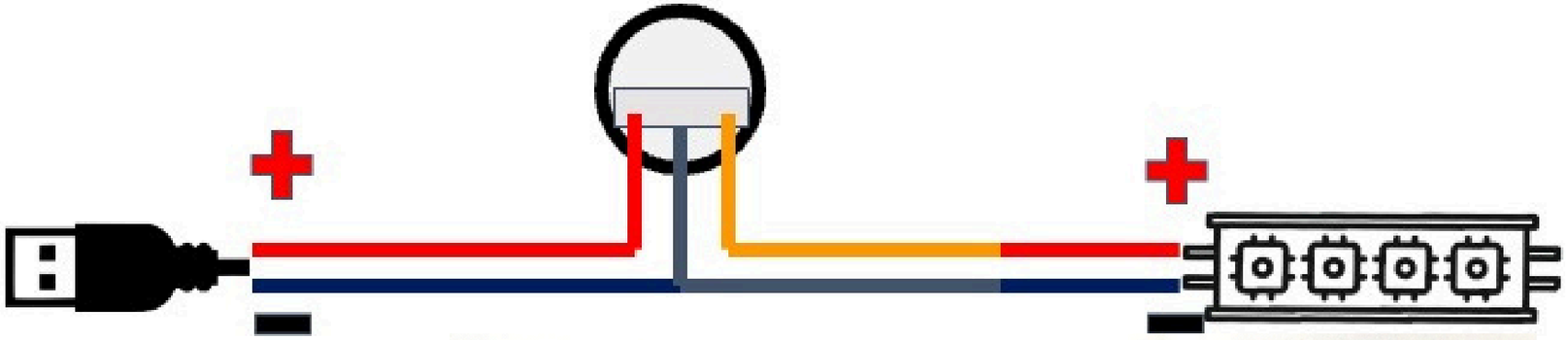
17.USB供電正極進入觸控開關正極

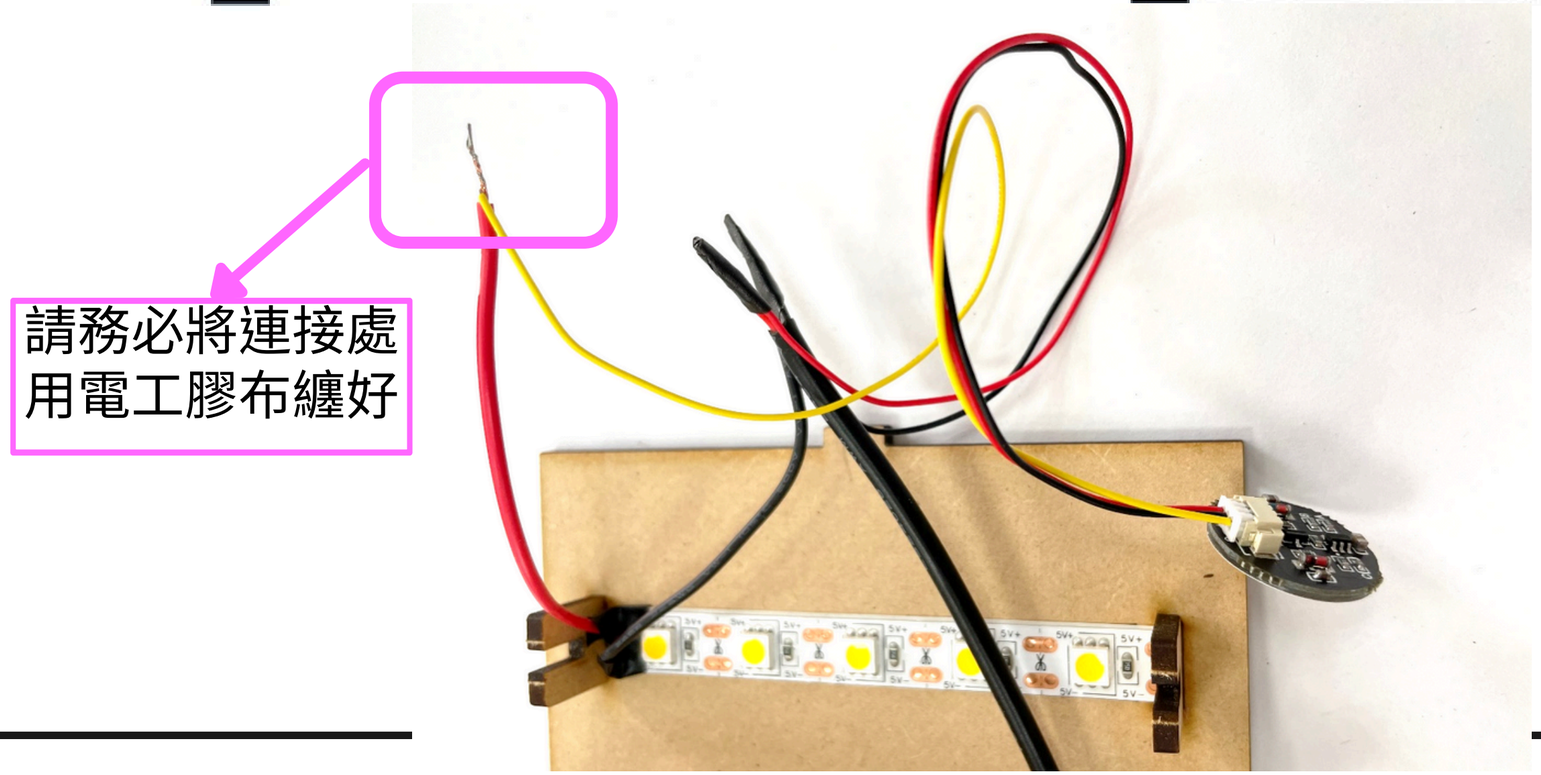




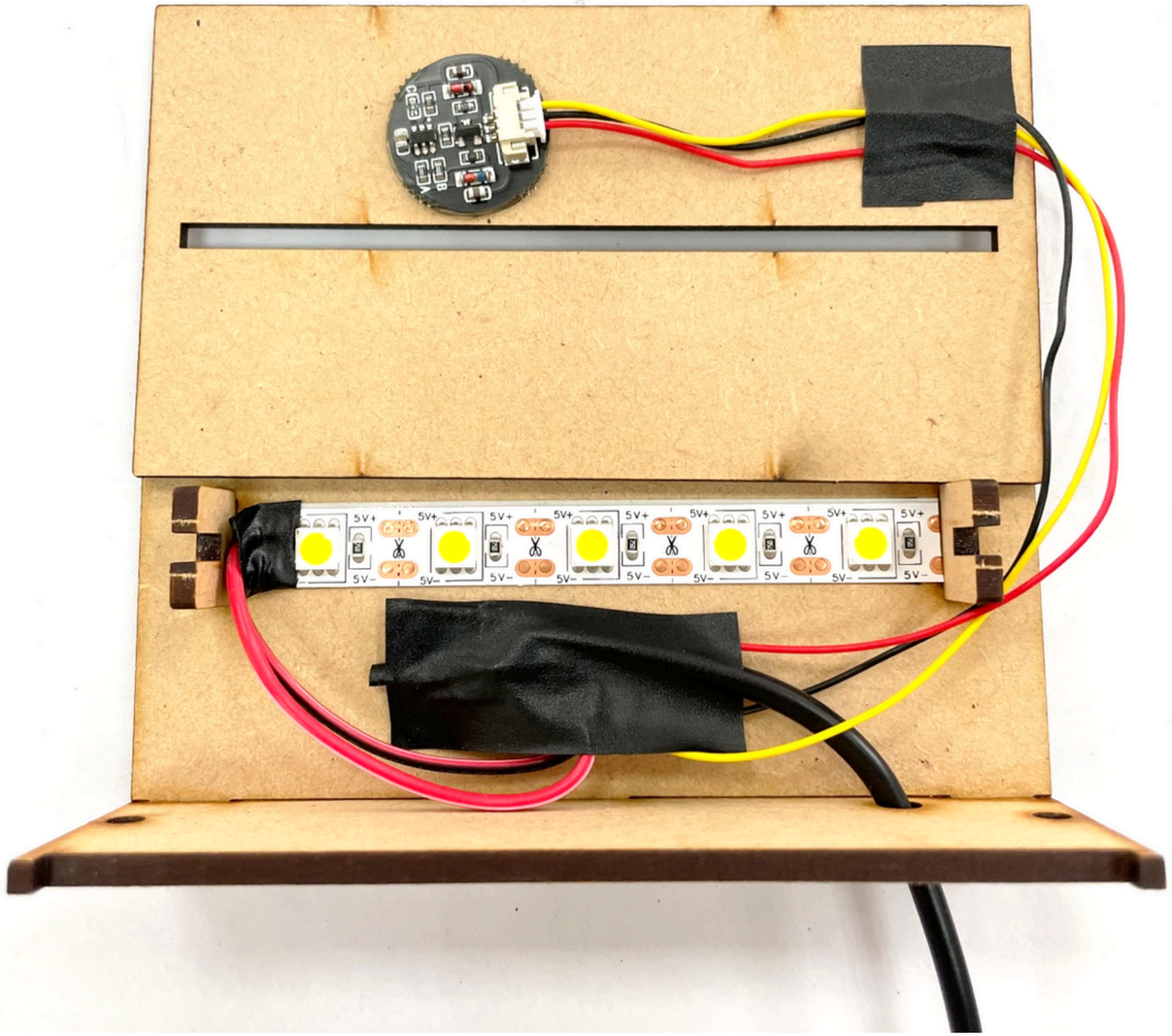


18.由觸控開關決定電流是否要進入燈條正極





19.將整理導線與觸控開關位置固定於盒內

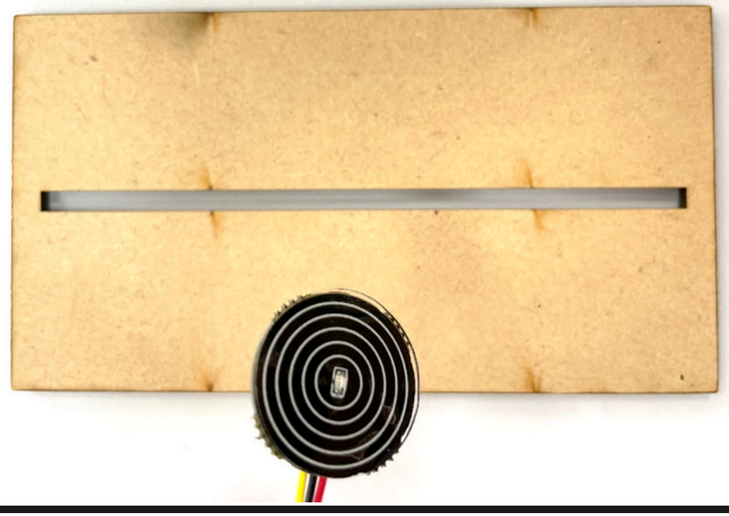


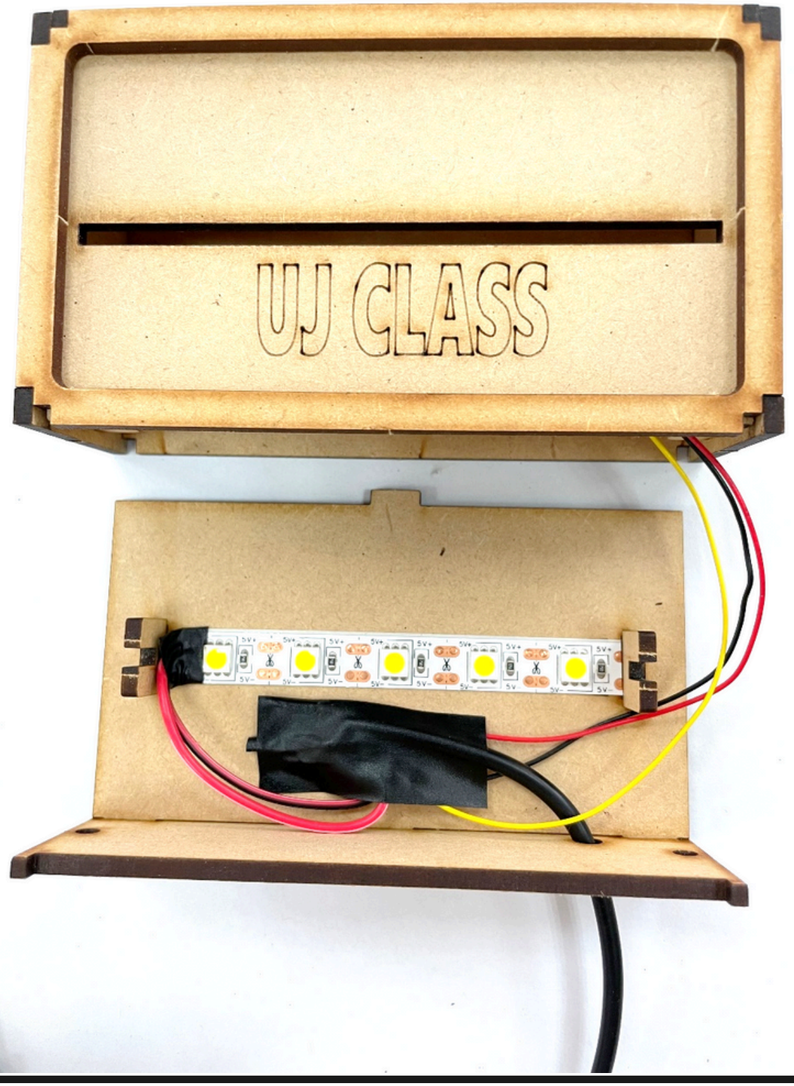
20.撕開觸控開關背膠與裝上燈盒上蓋

組裝專屬你的觸碰燈

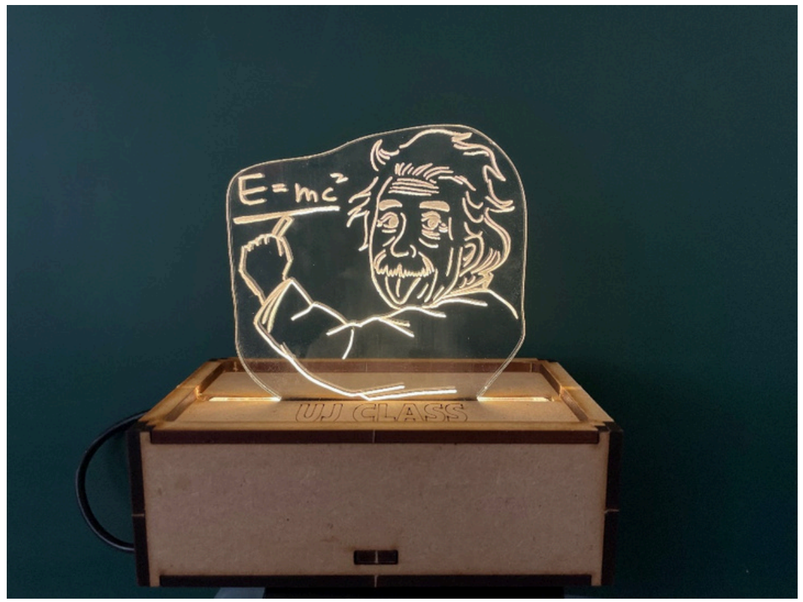
讓愛因斯坦散發智慧的光陪你工作上班！

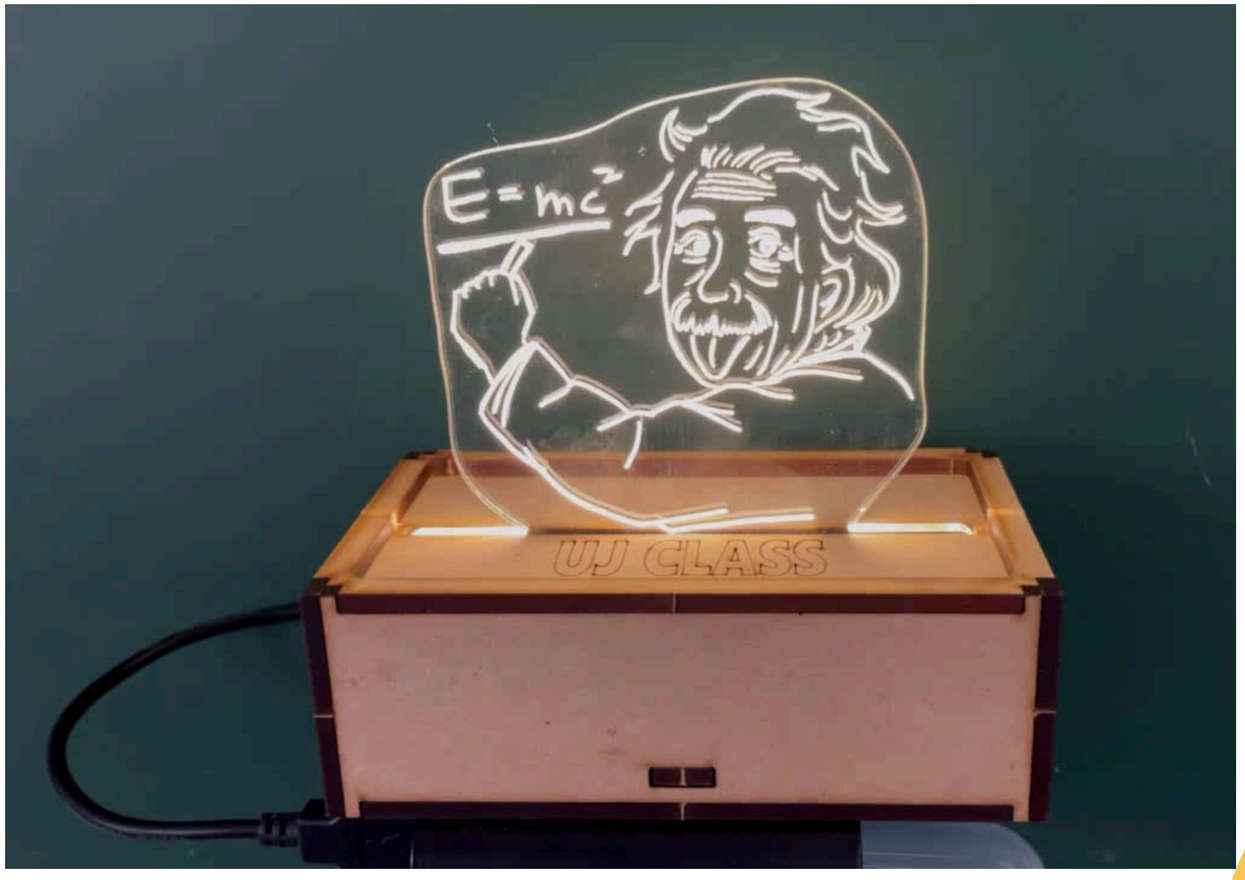
1. 把壓克力片插入盒子縫隙
2. 將USB線插入電腦主機
3. 按下YDFE字樣中的【D】
4. 從旁邊欣賞觸碰燈的燈光



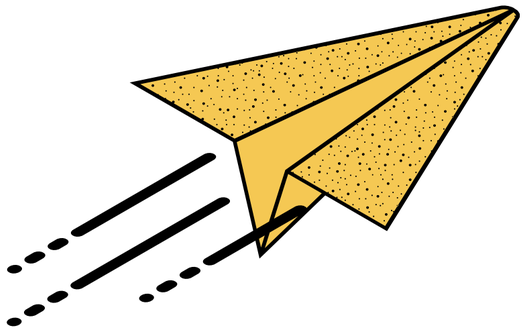


21.鎖上螺絲即完成囉





Presented by Una Hsu



THANK YOU!