

## 測驗橋樑結果

自重：\_\_\_\_\_克

第一次加重重量：\_\_\_\_\_克

第二次加重重量：\_\_\_\_\_克

第三次加重重量：\_\_\_\_\_克

總負重：\_\_\_\_\_克

負重強度：\_\_\_\_\_克

請給自己的作品評分 ( 0 - 10 )

\* 完全達不到要求 0 1 2 3 4 5 6 7 8 9 10 表現優秀

## 老師評分

老師評分			得分
設計及傳意	繪畫技巧	徒手立體圖/斜視立體圖/等角徒手圖/投視圖	/40
	設計意念	資料搜集/草繪及繪圖/創意：形狀、造型	
學生作品	表面處理	安全：沒有尖角利邊、成品自身強度適中、不會輕易破爛 工藝：準確度、表面處理的質量 正確使用/善用材料 正確使用/善用科技及技術	/50
	習作功能	功能：實用性、可行性 外觀：形狀、造型、顏色、質感、大小比例	
學生態度	行為操守	對社會文化的影響 學生在課堂上的態度： 包括投入工作、下課時整理工作枱、課堂行為、對工作有要求	/10
老師評語			總分 /100

## 情景

在你前面有兩個小島，在它們之間有一個海峽，請你們在這個海峽之上建造一座橋樑，方便兩岸交通。

## 目標

運用飛機木方條，製作一座橋樑模型。

## 作品要求

橋樑模型  
必須以所派發的物料作為製作材料，不可以自行加添。  
橋長不少於600mm  
橋面寬不多於150mm  
橋高不多於250mm  
橋樑設計為拱型，足夠一個高80mm、寬230mm的箱子經過  
橋樑中點位置，需負載最多重量

## 材料

飛機木方條 10mm x 10mm x 910mm  
萬能膠

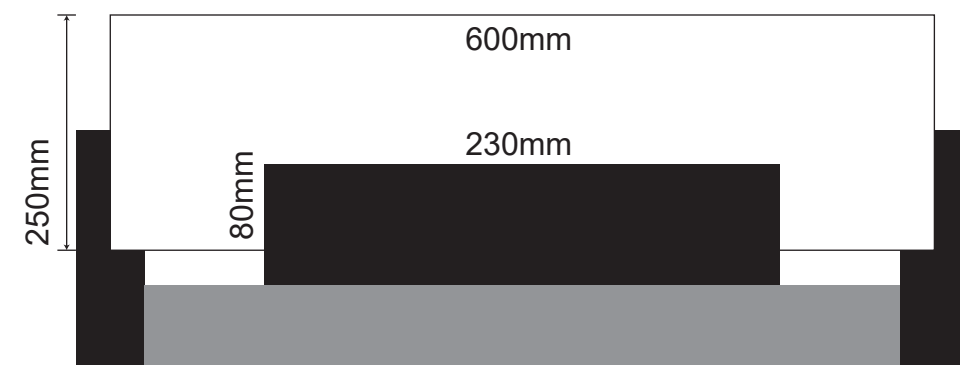
## 作品要求

橋樑結構，可以承物件重量之能力，橋樑總負重 50%  
橋樑的美觀性，設計意念 40%  
學生態度 10%

## 負重比例

	自重	總負重	負重比例
橋樑例子一	85	1500	17.65
橋樑例子二	85	1600	18.62
橋樑例子三	73	1400	19.18

比賽過程  
參看參考圖片



觀賞電影時，請於空白地方填上答案或完成基本選擇題



問題	解決辦法	明石海峽大橋
1 材料	1. 由石材轉變為_____	1. 使用_____萬噸鋼材
塞文河寬_____米	2. 橋越長，石拱越_____	2. 鋼材的缺點：_____
		3. 使用_____檢查及維修。
2 錨定法	1. 如要將橋面放平， 建造_____	1. 需要建築錨定點
梅奈海峽 大橋長_____米	2. _____固定鐵索於岩洞中	2. 將巨型_____放於 地底下
3 強化鋼索	1. 鐵轉為_____，令材 料更受力	1. 每次拉_____條鋼絲去對面岸
尼亞加拉大 橋長_____米	2. 例子：_____ → _____	2. 一共使用_____束鋼絲
負載 300噸火車	3. 強度：鐵釘 350LB， 鐵絲：_____	3. 可環繞地球_____次
4 建造橋墩	1. 使用木板建做_____	1. 橋塔的直徑_____米
布魯克林 大橋_____米	2. 強力氣泵將_____ 打入沉箱	2. 使用鋼桶代替木板沉箱，內裏 注入_____
5 橋塔高度	1. 橋越長，橋塔需越高	1. 橋塔共_____米高
金門海峽_____米	2. 用_____代替 石塊建造橋塔	2. 內部使用_____結構
	3. _____結構-空心長筒	3. 使_____接合每個組件
6 _____	1. 問題：_____不穩定，形成 漩渦	1. 鏤空鋼骨架→_____形 設計
雙層橋面	2. 於橋的側面設計成 _____	2. 於行車底部中間位置加上 _____令氣流改變方向。
韋拉札諾海峽	3. 幼鋼支建成_____	
7 _____	防震措施：1. 橋塔由_____製造，有彈性	
明石海峽_____米	2. 於橋塔加裝_____，令橋塔穩定	

提示：(鑄鐵、棉花、鐵、錨、石塔、250、骨架結構、螺柱、鋼、機械人、80、阻尼器、沉箱、生鏽、巨型鋼樑、鋼板、流線形、空氣、高、棉線、鐵絲、岩石錨、177、錨定法、蜂窩、氣流、濕混凝土)

# 通航餘隙

# 通航餘隙

## 測試橋樑規則

1. 所有橋樑在測試前，應為橋樑磅重。
2. 成績將以 (能負重的重量：結構架的重量) 負重強度比計算成績。
3. 所有重量需要放在橋樑的中間位置，每一次加重，只能放在之前已加重量的位置上。
4. 每組學生可有三次機會加重於橋樑上。
5. 重量選擇分別有：A4 13KG, 正方磚 3KG, 5KG, 2KG, 1KG。
6. 每次請各同學先決定加重的數量，如已完成加重，在三秒內橋樑沒有斷開，重量會計算在內。
7. 如在加重的過程中，橋樑斷開，重量會計算在前一次的重量上。

**Test bridge results**

Weight of bridge : \_\_\_\_\_ g

1st Loading : \_\_\_\_\_ g

2nd Loading : \_\_\_\_\_ g

3rd Loading : \_\_\_\_\_ g

Total Loading : \_\_\_\_\_ g

Loading strength : \_\_\_\_\_ g

Please comment about your bridge

Cannot meet the requirement 0 1 2 3 4 5 6 7 8 9 10 Outstanding

**Teacher Comment**

Teacher Comment			Marks
Design Process	Drawing Technique	Freehand Sketch(3D)/Isometric Freehand Sketch/ First angle projection drawing	/40
	Design Concept	Data Collection/Sketch and Drawing/Creativity of Shape and Form	
Production Process	Finishing	Safety: No sharp edges and corners, moderate intensity, not easy to break Crafts: Accuracy, Surface finishing Correct/ Good use of materials Correct/ Good use of technology and skill	/50
	Function of the product	Function: Partiality, Feasibility Exterior: Shape, Form, Color, Texture, Scale	
Student Attitude	Behaviour	Impact on society and culture Student attitude in the classroom	/10
Teacher Comments			Total /100

**Situation**

There are two islands and a strait between them. This project requires you to build a bridge over the strait, to facilitate cross-strait traffic.

**Design Brief**

Make use of balsa wood to build a bridge model.

**Specification**

Bridge Model

Only use the distributed materials as a production material and cannot put addition material.

Spans more than 600 mm long.

Height no more than 250 mm.

Width no more than 150 mm

The bridge is designed as arch shape, enough for a box with a height of 80mm, a width of 230 mm to pass through

The midpoint of the bridge needs to be loaded with the maximum weight

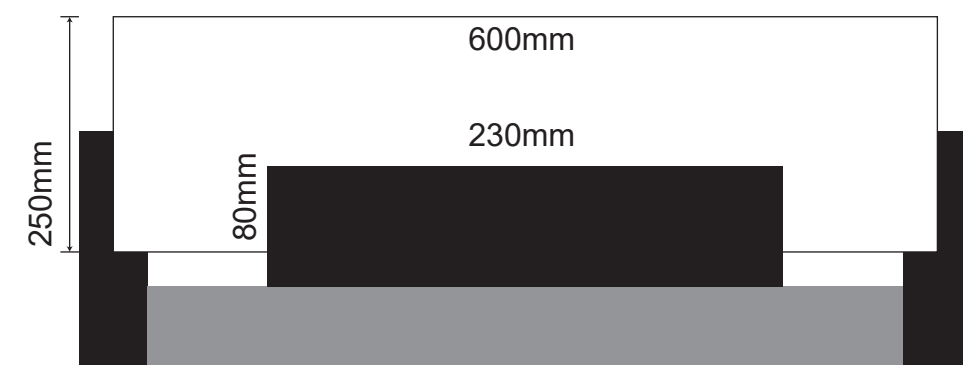
**Material used**

Balsa wooden square 10mm x 10mm x 910mm

**Weight ratio**

	Weight	Load	weight ratio
Bridge Example 1	85	1500	17.65
Bridge Example 2	85	1600	18.62
Bridge Example 3	73	1400	19.18

Competition  
Photos



When watching the movie, please fill in the blanks or Complete the online basic questions.

	Question	Solution	Akashi-Kaikyo Bridge
1	Material	1. From stone to _____.	1. Using _____ ton of steel.
	Iron bridge _____m	2. The longer bridge, _____ stone arch.	2. The disadvantage of steel is _____.
			3. Made use of _____ to repair & maintenance.
2	The suspension bridge	1. To flatten deck of bridge, it needs to build _____.	1. Build _____.
	Mania Bridge _____m	2. _____ Anchor the chain in the Rocky bed.	2. Build a _____ under the grand.
3	Stronger chains	1. Iron to _____, → material will much stronger.	1. Every tine holds _____ wire to the opposite shore.
	Niagara Falls Bridge _____m	2. Example : Cotton row → _____.	2. Totally _____ bund wire.
		3. Strength : iron _____ Lb Wire 450Lb	3. The contain wire enough around the earth _____.
4	Building underwater	1. Use of wood prece to build _____.	1. The diameter of the bridge towers _____ meters.
	Brooklyn bridge _____m	2. Strong _____ the air into the caisson.	2. Use steel to make the caisson, inside fill with _____.
5	Taller towers	1. The longer the bridge, the _____ the towers.	1. Tower height _____m.
	Golden gate bridge _____m	2. Use of _____ instead of stone.	2. Internal use honeycomb structure.
		3. _____ → hollow shape.	3. Use _____ to join each component.
6	_____	1. Problem: _____ unstable, shape up & down push the desk.	1. Hollow steel skeleton → _____ shape design.
	Verrazano Narrows Bridge _____m	2. At the side of the deck designed as _____.	2. Below the roadway build a giant _____ to change the director of air.
	Double deck bridge	3. Construction of steel bar to form a _____.	
7	_____	Earth quake measures: 1. Tower made by _____.	
	Akashi-Kaikyo Bridge _____m	2. Install _____ in the tower.	

Hints: (1991, steel, dampers, Earth Quake, skeleton union, streamline, steel beam, 1298, steel plate, air pump, Triangle, Honeycomb structure, 1280, 300, higher, 7, cotton thread, 290, big concrete anchor, aching, robot, Wind, air flow, studs, wet concrete, 486, 80, caissons, 350, 127, wire, 250m, Tower, 177m, stone tower, rust, Higher, cast iron, 250000, 30m )

Navigation Gap

Navigation Gap

### Test bridge Rules

1. All the bridges should be weighted before testing.
2. The grade will be calculated by weight ratio (weight : load)
3. All the weights need to be placed in the middle of the bridge.
4. Each group have three chanced to add weights on the bridge.
5. The weight has A4 13KG, square brick 3KG, 5KG, 2KG, 1KG
6. Each group decide the amount of weight will be add. If the weight adding completed, the weight will be counted with the bridge will not break within 3 seconds.
7. If the bridge is broken during the weighting process, the weight will be calculated on the previous weight.