

**情境**

立體打印技術能協助釋放個人創意，更被譽為是第三次工業革命或21世紀最重要的科技，作為現代學生認識立體打印是不可或缺的一部分。

**設計綱要**

設計及立體打印一件有趣/創意/造型優美的欄杆，欄杆必須插入安裝土地上的銅柱。所有77分或以上的設計均會以熱熔堆疊成型立體打印機打印原型。而最優秀的十位設計將會打印成1:1比例，在本中心的花園內使用。

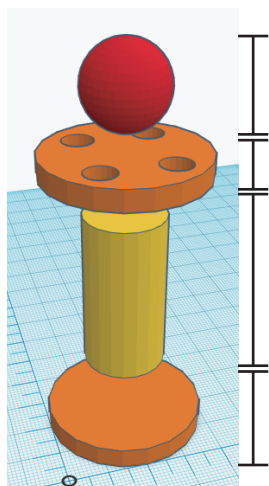
**設計考量**

安裝在地上的銅柱的直徑是\_\_\_\_\_及長度是\_\_\_\_\_。

欄杆的長度不高於300mm。

外型：美觀、有意義、有趣及具創意。

欄杆\_\_\_\_\_：四邊/五邊/六邊/八邊或橢圓形。

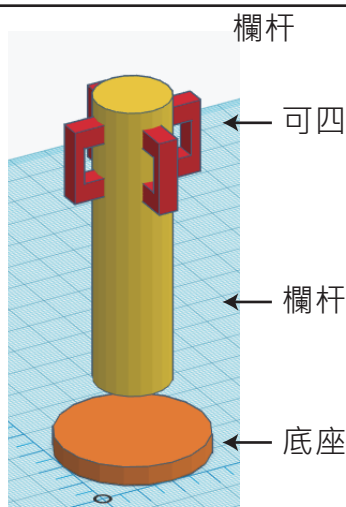
**欄杆的基本結構**

欄杆頂部外形設計

可四面扣上塑膠鍊

欄杆

底座

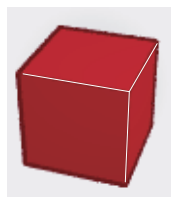


欄杆

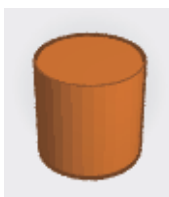
可四面扣上塑膠鍊

欄杆

底座

**欄杆適用的基本造型**

方塊



圓柱



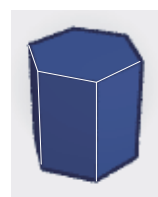
拋物面



星形



星形



多邊形

參看參考圖片



你最喜歡是圖\_\_\_\_\_的設計，原因是\_\_\_\_\_

列舉所有繪製欄杆的造型及技巧：

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列舉所有創製裝飾的造型及技巧：

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有否任何感想(Tinkercad / 立體打印)? 欄杆的外形如何(幾何/對稱/不對稱/美觀/有趣/具創意)?

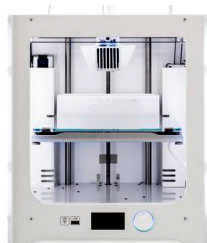
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請給自己的作品評分 ( 0 - 10 )

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



評分標準			得分
設計及傳意	CAD繪畫技巧	欄杆的基本造型 欄杆咀的基本造型 銅柱的準確性 個人化設計/裝飾	/40
	設計意念	欄杆造型/橫切面的適切性 個人化設計/裝飾的美感和創意 整體的外觀 立體打印的適切性	
學生作品	安全	沒有尖角利邊 沒有過度突出部份/弱點 欄杆和裝飾物合理強度，不易破爛	/50
	功能	能穩固裝入銅柱 欄杆是否穩固 善用電腦輔助設計軟件：TinkerCAD 善用立體打印科技：特徵尺寸合適、FDM沒有懸空部份 節約資源：尺寸精巧	
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	/10
老師評語			總分 /100

**Situation**

3D printing is well known as a one of the most important technologies in 21 century, as a technological student, you should be familiar with it.

**Design Brief**

Design and 3D print of a fun / creative / beautiful railings to be fitted with a copper rod. Designs of 77 marks or above and the design of highest mark in the class will be printed with Ultimaker 3. And the best ten will be printed in 1:1 ratio, and use & display in our school garden.

**Design Considerations/ Limitations**

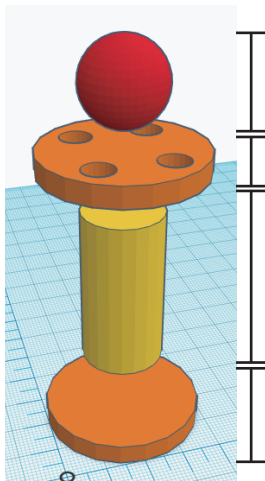
Copper rod diameter is \_\_\_\_\_ and length is \_\_\_\_\_.

The length of the railing is not more than 300mm.

You should design a few side hole on top of the railing which attach with a plastic chain.

Appearance: beautiful, meaningful, fun and creative.

The \_\_\_\_\_ of railing : The relationship between the shape (squareness/five side/hexagonal/octagonal or elliptical shape) and the grip comfort .

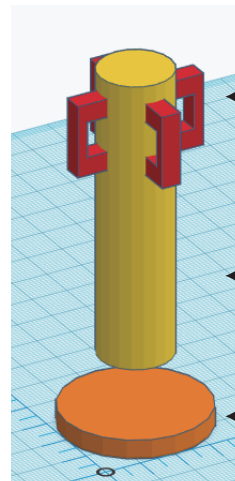
**Basic shape of the railing**

Top of railing design

Four side hole attach with plastic chain

Body of railing

Base

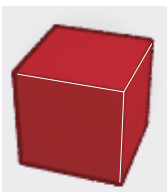


Four side hole attach with plastic chain

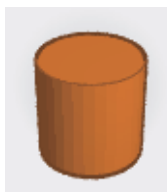
Body of railing

Base

reference picture



Box



Cylinder



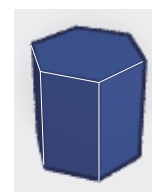
Paraboloid



Star



Star



polygon



My favorite design is picture no. \_\_\_\_\_ because \_\_\_\_\_

1. List the basic shapes and techniques you have used in creating the railing.

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2. List the features / basic shapes and techniques you have used in decorating the railing..

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3. Any feelings / reflections about using TinkerCAD / 3D printing? What is the shape of the railing. (geometry / symmetry / asymmetry / beauty / fun / creative)?

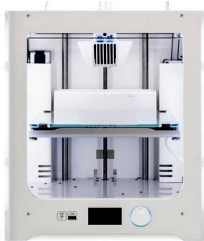
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5. Please comment about your design ( 1 - 10 )

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



### Teacher Comment

Marks

Design Process	CAD Drawing Technique	The basic shape of the railing The basic shape of railing Copper rod hole accuracy Personalized design/decoration	/40
	Design Concept	Form / cross-section fit for purpose Personalized design/decorative beauty and creativity Appearance The suitability of 3D printing	
Production Process	Safety	No sharp edges No weak point Railing and decorations are reasonably strong and not easy to break	/50
	Function of the product	Can be firmly fitted with copper rod Railing grip comfortably Smart use of computer-aided design software: TinkerCAD Use of three-dimensional printing technology: feature size is suitable, FDM is not suspended Conservation of resources / compact size	
Student Attitude	Personality	Impact on society and culture Student attitude in the classroom	/10
Teacher Comment			Total  /100