

# 數學科

隨著社會對教育訴求的變遷，培養學生的解難能力和探究能力是現今數學教育的重要目標之一。有見及此，本校數學科致力推動以解難和探究為本的教學活動，務求提升學生的高層次思維能力。



數學科老師正進行共同備課



學生正動手解決數學問題

## (一) 著重學生參與的課堂教學

### 1. 電子學習

本科今年開始提倡「老師少講、學生多做」的課堂教學，由以往單向的傳授模式轉變為學生主導的學習模式，老師扮演引導者的角色啟發學生探究為本思考。在課堂設計上，我們著意增加學生「動手」參與的機會，讓他們從嘗試中掌握解難技巧。

A screenshot of the Geogebra website. At the top, the Geogebra logo is on the left, and navigation links for 'Materials', 'Downloads', 'Community', 'Help', and 'Sign in' are on the right. Below the logo, the text 'Dynamic mathematics for learning and teaching' is displayed. Three main icons are shown: a person pointing at a screen labeled 'Browse materials', a hand interacting with a tablet showing a graph labeled 'Start creating', and a computer monitor with a download arrow labeled 'Download now'. There is also a 'Start creating' button next to the tablet icon.

## GEOGEBRA

IS A MULTI-PLATFORM MATHEMATICS SOFTWARE THAT  
GIVES EVERYONE THE CHANCE TO EXPERIENCE THE  
EXTRAORDINARY INSIGHTS THAT  
MATH MAKES POSSIBLE



GroupHome | Edit Page | Recent Changes Search Go

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## Technology for Teaching "Thinking Mathematics"

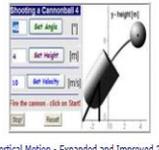
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It is neither just about "filling the bucket" nor just "lighting the fire" - it is about "making the coffee", that is having the knowledge, skills and motivation to get the whole job done!

- Some stuff for using technology in mathematics to teach thinking, where stuff = interactivities, mathcasts, good questions, animated images, open-ended discussions, links to other people's good stuff, etc.

First time here? Click on an image below to see a sample resource!

Want something specific? Use the navigation bar at left or search at top right!

What's an interactivity?		
<p><b>Measurement (K-6)</b></p> 	<p><b>Slope (6-12)</b></p> 	<p><b>Physics (College)</b></p>  <p style="font-size: small;">Also: <a href="#">Vertical Motion - Expanded and Improved 2009</a> 🤖</p>
Tool Discussions		
<p>A little screencast about the freeware GeoGebra</p> 	<p>Animated Directions</p>	

[edit sidebar](#)  
[Configure Firefox/Slin](#)  
 \*\* pmw6-2.1.27 \*\*

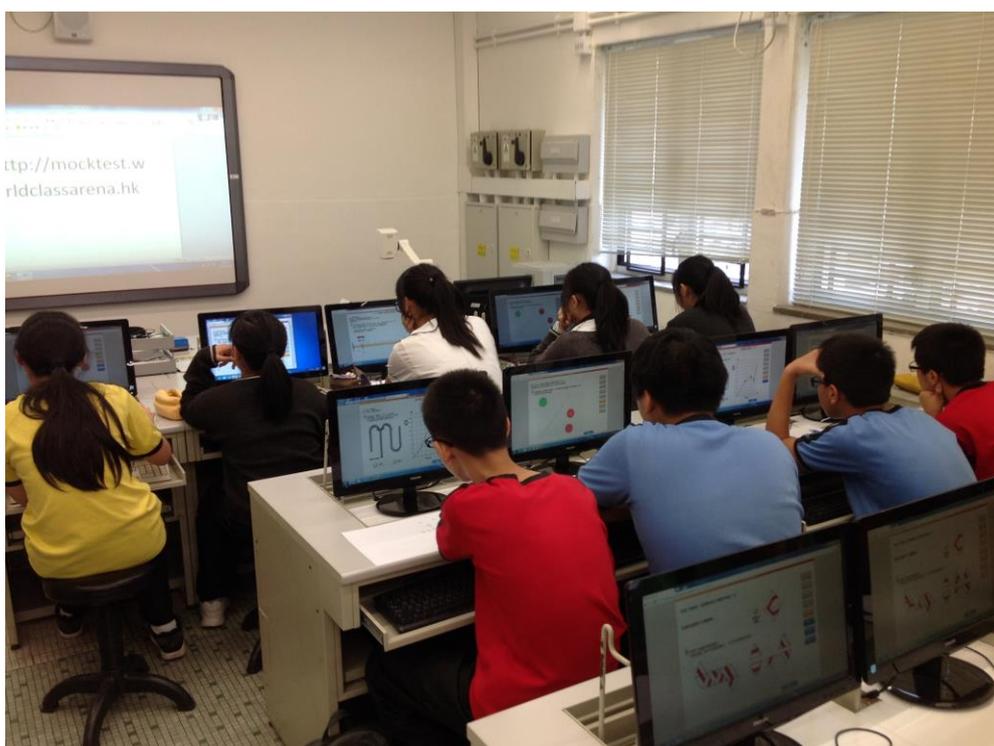
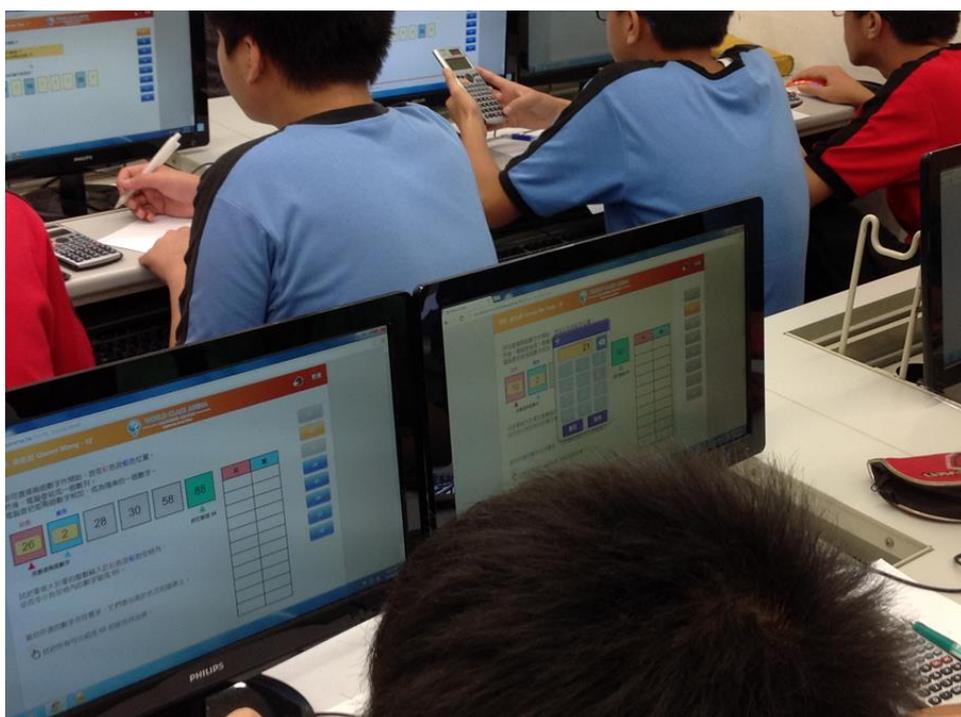
To view mathcasts you will need the freeware: [flashplayer](#) and [sunjava player](#).  
 To use geogebra interactivities you will need the freeware: [sunjava player](#).  
 To properly view math notation (jsmath) you will need to install the 6 fonts: [TeX-fonts-25.zip](#)





過去亦參加「世界數學測試」(World Class Tests)。「世界數學測試」專為挑戰青少年的邏輯思維及科研潛能而設，是 World Class Arena 的核心部分。「世界數學測試」亦被視為一項國際所認受的基準參考，用作辨認及評核有志於科學探索的資優青年。

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## 2. 著重啟發

數學教學是否具啟發性，往往取決於老師的提問數學問題的設計。本科嘗試透過同儕觀課、共同備課、課堂研究及舉辦培訓課程等方式提升老師這方面的能力。老師在課堂上藉著高效

提問、開放題、一題多解問題、互動幾何問題及解難技巧訓練等，提升學生的高層次思維能力。



中一自主學習課堂

自主學習工作紙-----對稱與變換

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Class : 1B

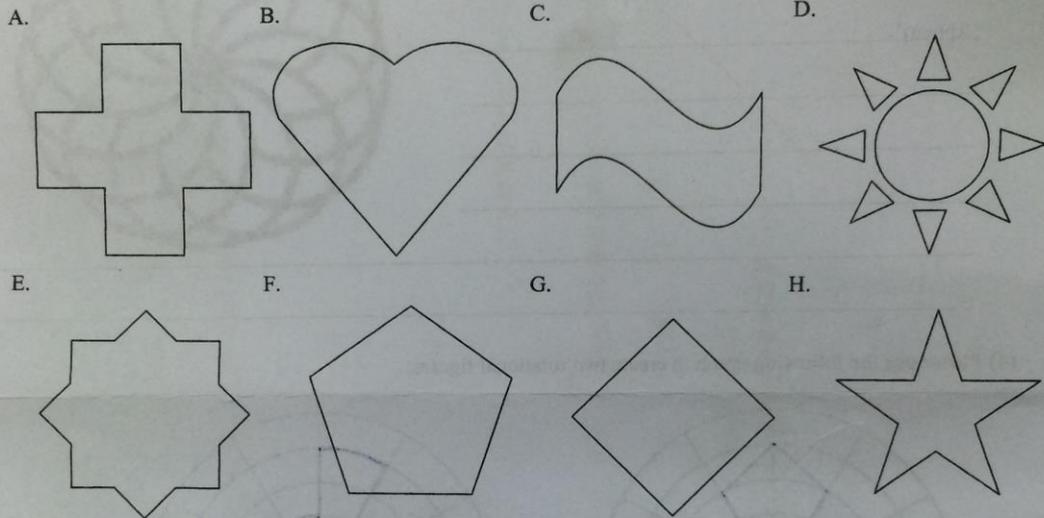
Name : Ma Ying Ka, Lam man shan, So Ka Kit,  
Leung Ka Kit

**A--**  
*good!*

Characteristics of plane symmetry figures:

Question :

Please put a '✓' if the following figure has the property of symmetry. Please state other features if the figures has other features

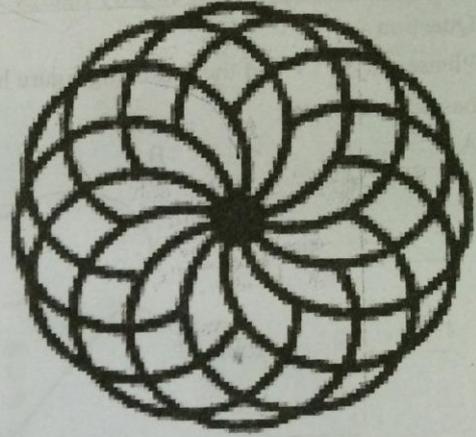


Features of figures	A	B	C	D	E	F	G	H
Reflection Symmetry ✓	✓	✓		✓	✓	✓	✓	✓
8 - fold ✓	✓		✓	✓	✓	✓	✓	✓
5 - fold						✓		✓
2 - fold ✓			✓					
4 - axis	✓			✓	✓		✓	
4 - fold	✓						✓	
5 - axis						✓		✓

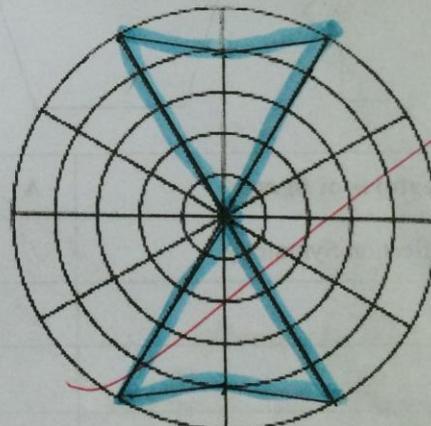
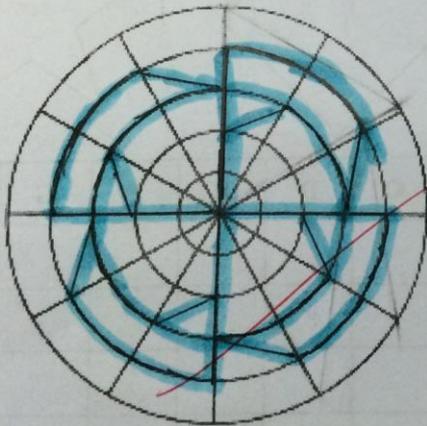
ELCHK Lutheran Secondary School  
From one Mathematics

) Please observe the following figure, analysis the process of making the following figure:

Draw a circle and draw one  
more on the centre of the  
circle one and do it 11 times



) Please use the following graph to create two rotational figures:





#### 4.另類評估

我們相信評估應以學生為中心，並且能促進學習，所以評估不應局限於紙筆運算。早於三年前本科已參與教統局的種籽計劃，共同研究如何推行數數問題  $nCr$ 、 $nPr$  及概率---獨立事件、互折事件。我們希望學生可藉著引導同學，去解決問題，並在匯報過程中有機會解說自己的思路。

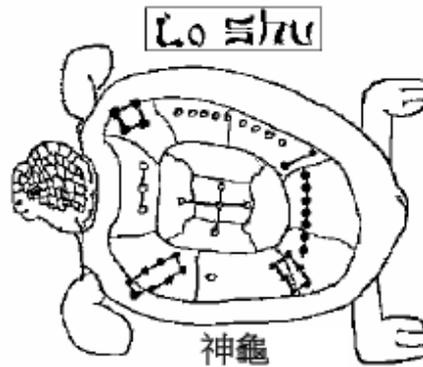
#### 5.擴闊視野

本科一直鼓勵學生從閱讀中學習，因此在學校圖書館及數學網頁提供一些數學書籍供學生借閱。另外，為了學生能在輕鬆的環境下培養運用數學的信心及能從多方面認識數學。通過數學周，本科亦自行編製了一系列的閱讀材料及比賽，包括「每日數學思考題」、「Rummikub 訓練班及比賽」、「數學家生平和貢獻知識展」、「數學謎題及遊戲」等，學生可以藉此探索數學中的不同領域。

The screenshot shows a web browser window displaying the Plastelina Logic Games website. The URL is <http://www.plastelina.net/games/game3.html>. The page features a navigation menu on the left with various logic games listed, including 'Wolf Sheep & Cabbage', 'Cannibals & Missionaries', 'Family Crisis', 'The Lonely Knight', 'Elevators Logic', 'Bags & Signs', 'Frogs Logic', 'Queens Logic', 'Knights Logic', 'Scales Logic', 'Golo's Dinner', 'Golo In The Cave', 'Logic Matches', 'Break The Machine 1', and 'Break The Machine 2'. The main content area displays a game titled 'The Family Crossing the Bridge'. The game interface includes a 'PLAY' button, a 'PREV' button, and a 'NEXT' button. The game text reads: 'Please help this family to cross to the other side of the bridge. Notice that: It is night, so, you must have a lamp. Each person cross the bridge at a different speed: 1 sec 3'. The game illustration shows a family of five people (a man, a woman, and three children) standing on a wooden bridge over a chasm at night. A small lamp is visible on the bridge. The website also features a banner for 'PIXELS THE MULTI-SCREEN ADVERTISING COMPANY' and a vertical sidebar on the right with various digital marketing icons.

## 幻方 (Magic Square)

根據傳說，在中國的文明時期有一大水災。人們嘗試向其中一條大河：「洛河」的河神獻祭，希望可以平息它的怒氣。但是，每次一隻烏龜由河裏游出來，並環繞獻祭而行，河神都不接受那獻祭。直到有一次，一個小朋友發覺烏龜殼上奇特的數字，因此他們便明白正確的獻祭數量 (15)。



### 神奇幻方是甚麼？

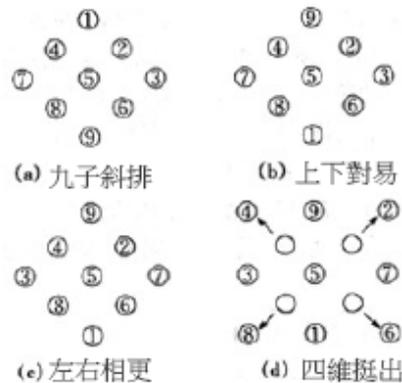
8	1	6
3	5	7
4	9	2

神奇幻方是指數目字由 1 至  $n^2$  在矩陣中的組合。而在這矩陣中，每個數目字只可出現一次，另到每行、每列和對角線之和都是同一個數值。

根據簡單計算，我們可以得出：每行、每列和對角線之和一定是  $\frac{n(n^2+1)}{2}$ 。

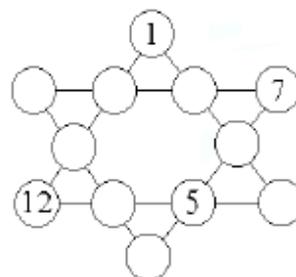
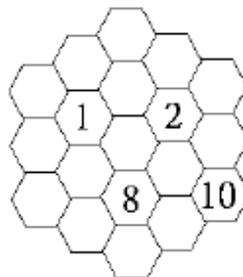
### 縱橫圖

由楊輝（字謙光，南宋數學家）所著的書《續古摘奇算法》中幻方被稱為「縱橫圖」。在這部書中給出了  $3 \times 3$  並說明  $3 \times 3$  幻方的作法（如右圖）。



完成以下  $4 \times 4$  的幻方，六角形及星形幻方：

1	2		
		4	
			6



## (二) 訓練思維的數學活動

為提升學生學習興趣、訓練他們的數學思維和解難能力，本科推行不少多元化的數學活動：

1. 定期舉行校內數學比賽，形式多元化，著重學生的解難技巧；
2. 舉辦數學周，提升學習數學的氣氛；



數學家生平和貢獻知識展(學生中心) (設有獎工作紙)

3. 舉辦數學遊戲比賽，從遊戲訓練學生的思維能力；



初中班際數學比賽訓練

除了以上的校內活動內，本科積極向外推廣提升高層次思維能力的數學活動。我們於 2014-15 年開始參與理工大學主辦的全港小學數學比賽(油尖旺區)，正好讓老師及參與的同學體現多元化數學解難的形式與探究的元素融入比賽之中。



全港小學數學比賽

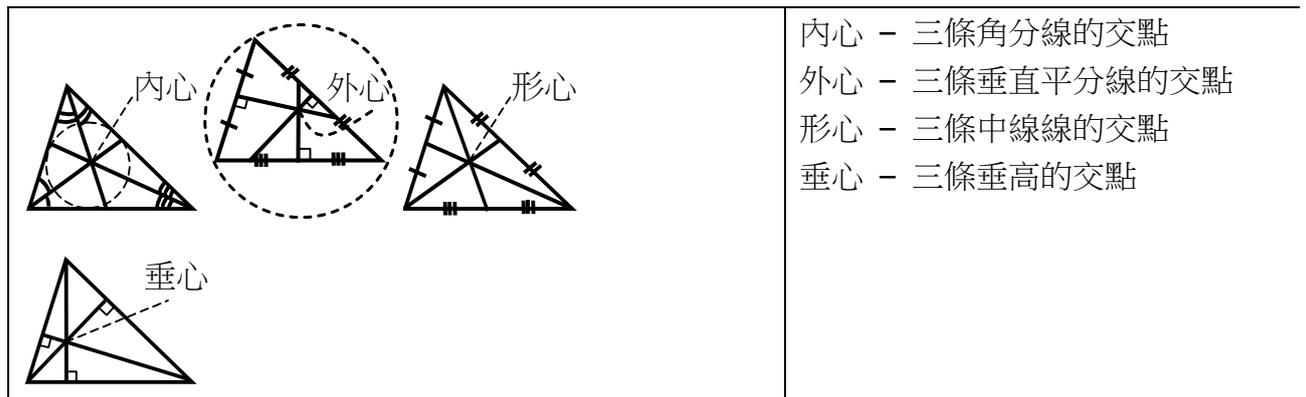
### (三) 同儕互助的學習空間——行動學習計劃

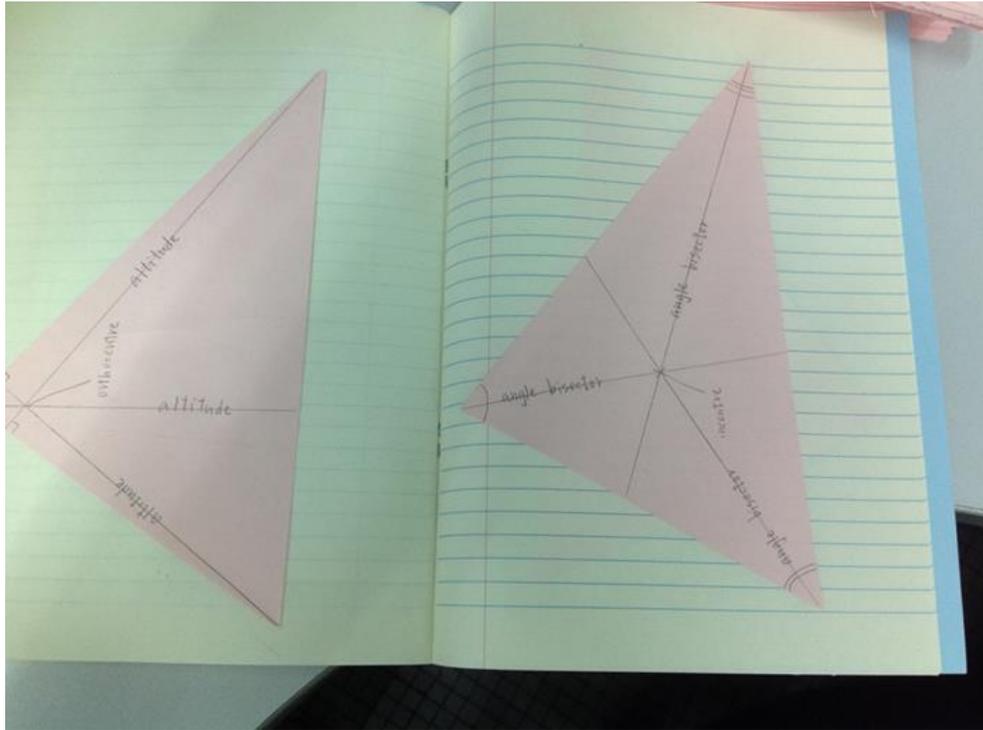
照顧學習差異改善學生學習：

與教育局專員討論有關照顧學習差異策略，支援學校開展在學與教方面的活動推行計劃：

1. 設立數學科學習圈及共同備課節(課程發展主任，數學科科主任及老師)
2. 調撥人力資源，與數學助理老師協助
3. 觀課及課業以照顧學習差異為焦點

如何利用摺紙理解 centers of triangle





用紙介紹四邊形的性質

