活動名稱：翻轉吧～面積 Flip It - Area

校名：高雄市立七賢國中

指導老師：劉頂榮、王曉莉

第一關：經由簡單的面積拼圖，思考面積問題。

Stage 1: Explore Area Concepts through Simple Area Puzzles

第二關：透過面積拼圖，理解數學公式-畢氏定理。

Stage 2: Understand mathematical formulas through area puzzles, especially the Pythagoras theorem.

第三關：觀察、找出面積的不同，理解斜率的變化。

Stage 3: observe and find the difference in area and understand the change in slope.

國小同學完成一關即可蓋章過關，通過二關另可獲得小禮物，

Elementary School Students will receive a stamp for completing Stage 1, and an additional small gift for passing Stage 2.

國中同學完成二關可以蓋章過關，三關都通過可獲得小禮物。

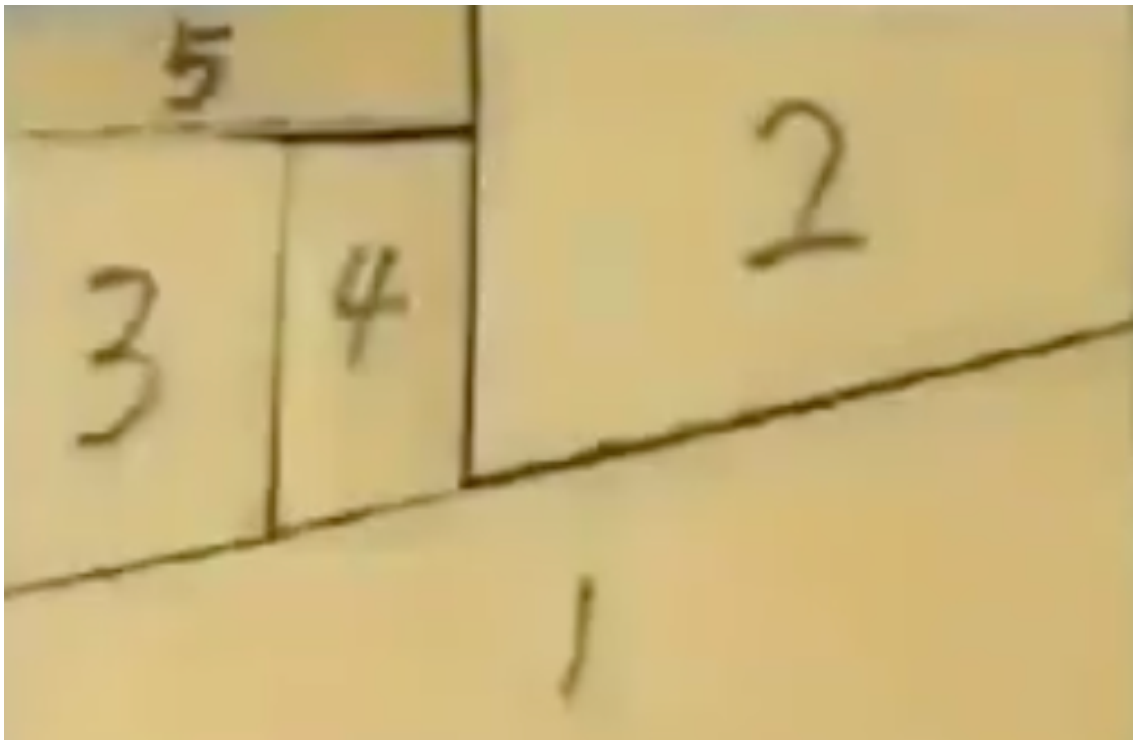
Junior High School Students will receive a stamp for completing Stage 2, and a small gift for successfully completing all three stages.

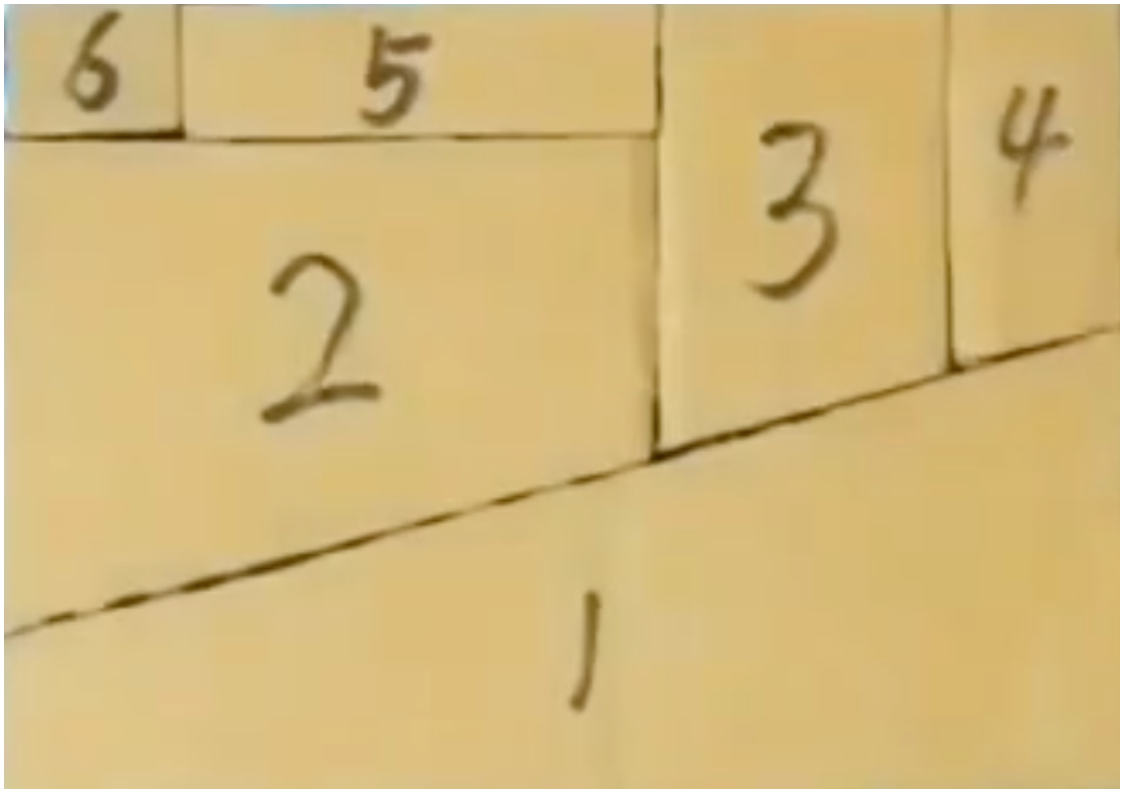
二、 活動器材

第一關:：如圖(一)，已切割完成的紙板珍珠版數張。

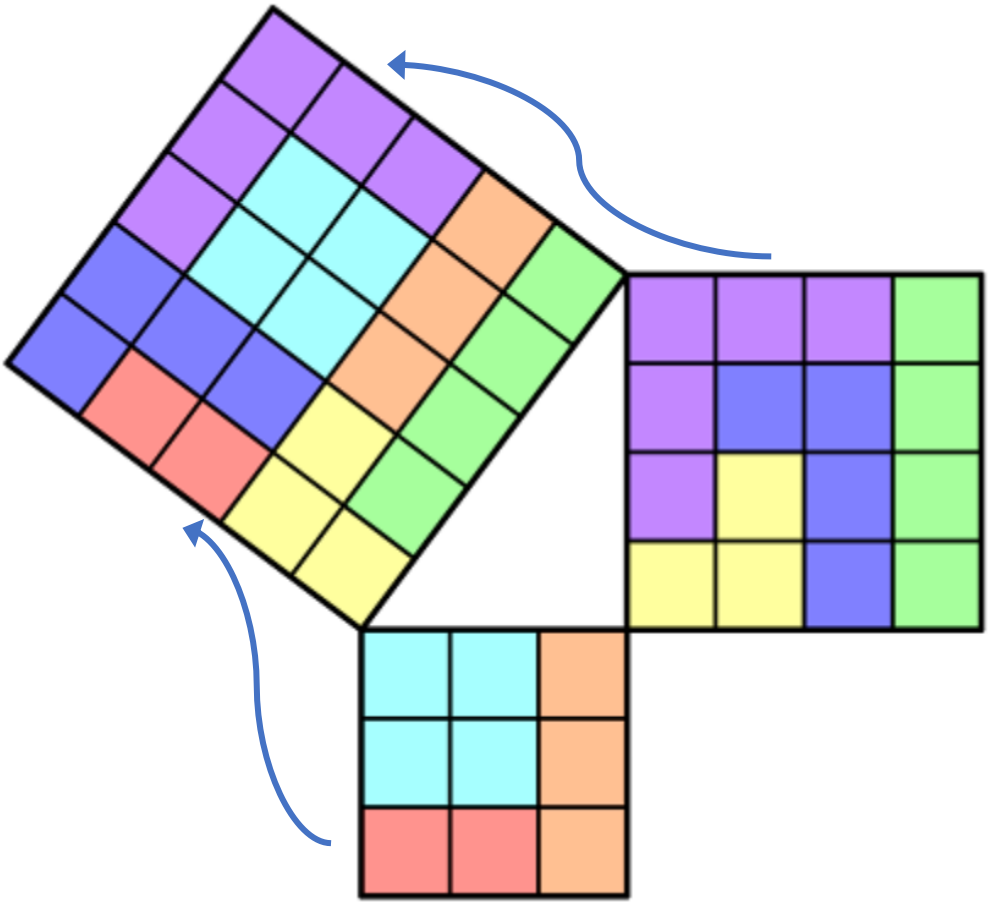
第二關:：如圖(二)和圖（三），已切割完成的色紙數張。

第三關：如圖(四)，已切割完成的珍珠版數張。。

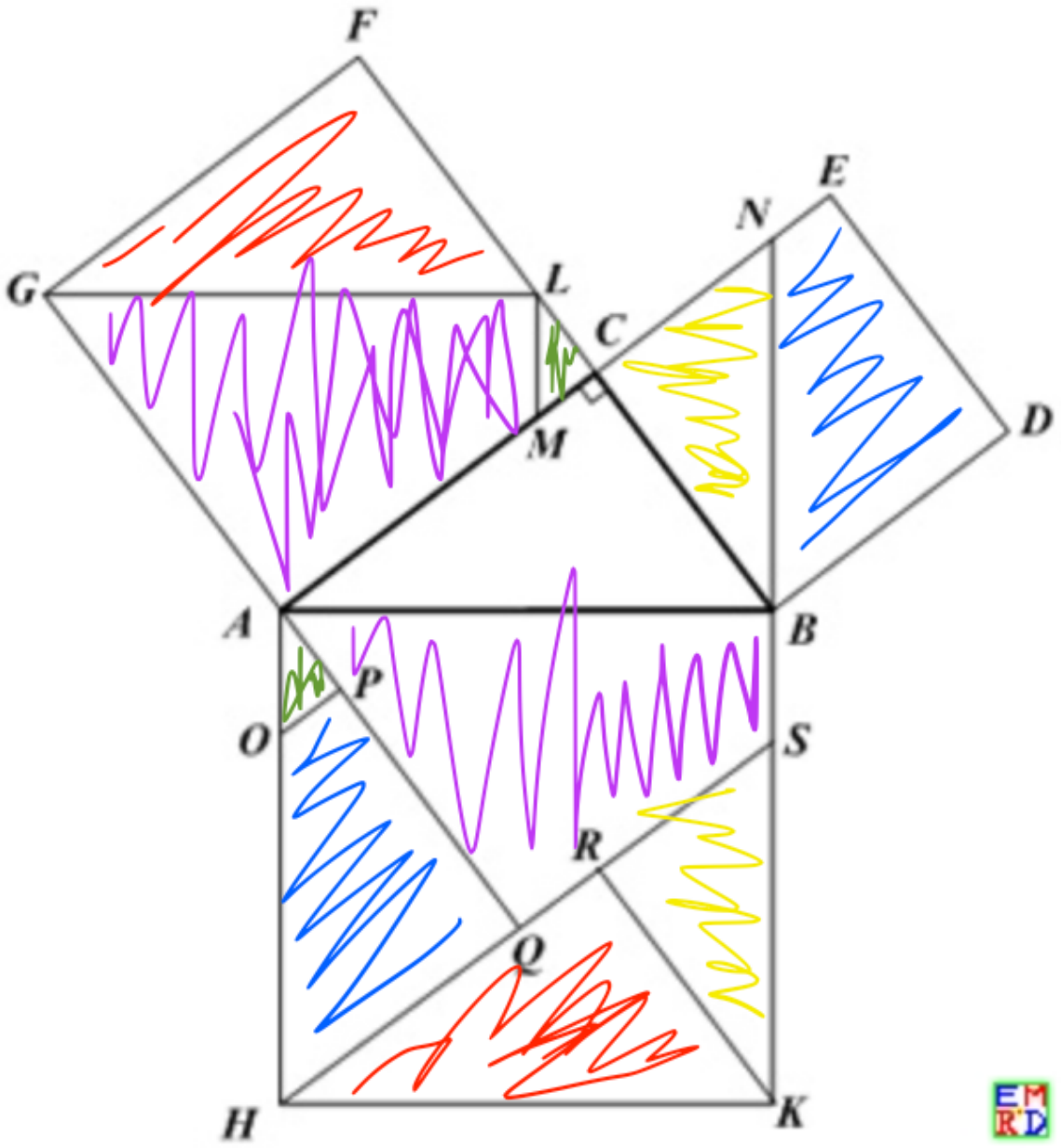




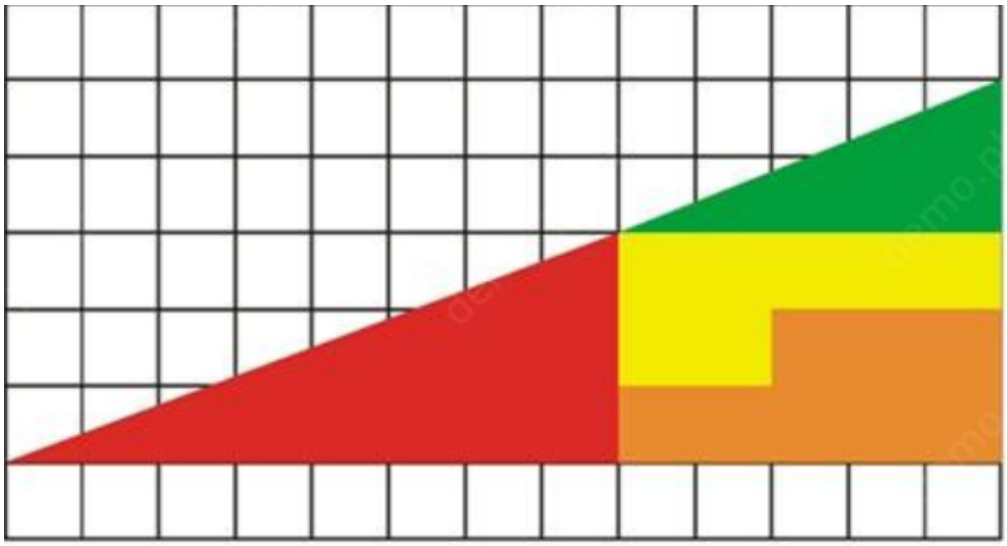
圖(一)

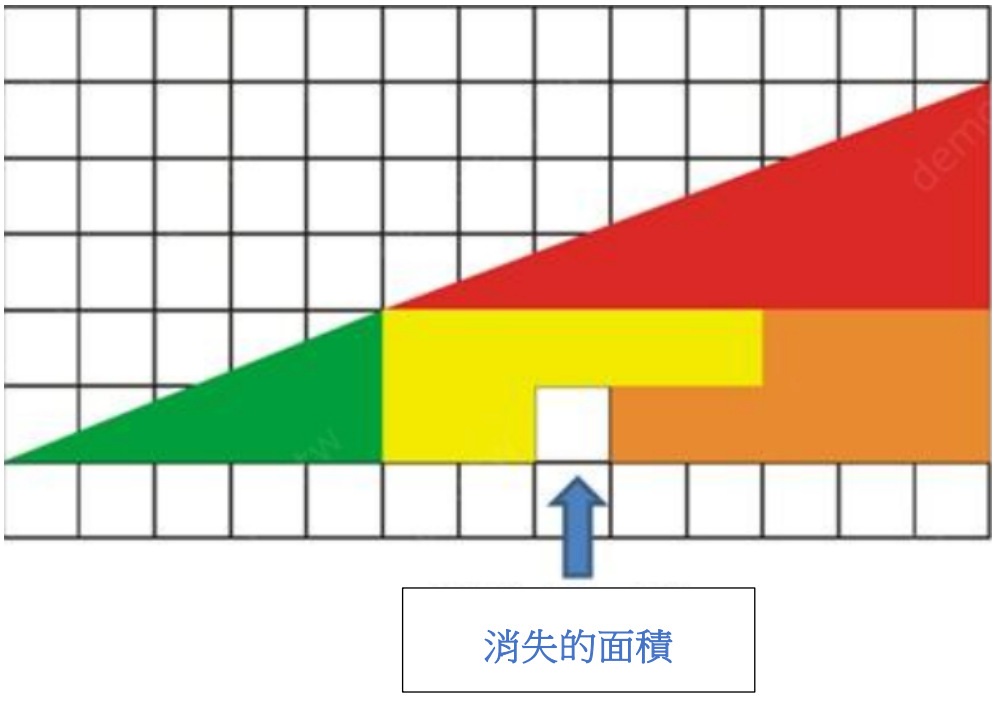


圖(二)



圖(三)





圖(四)

三、 活動過程 Activity procedure

本站分為三關，如下所述：This site consists of three stages, as described below:

第一關：Stage 1：

將 1~5 號拼圖，拼成長方形，經過圖形的平移、移動，可以再加入第 6 塊板子嗎？

Put puzzle numbers 1 to 5 into a rectangular shape. After the graphics are translated and moved, can a sixth board be added?

第二關:：Stage 2：

1、國小組，將兩個比較小的正方形拼圖（方格紙），全部移動放到最大的正方形

如圖二

For elementary school group, move two smaller square puzzle pieces (graph paper) to the largest square.

（As shown in Figure 2）

2、國中組，將兩個比較小的正方形（色紙），全部移動放到最大的正方形

如圖三

For the junior high school group, move all two smaller squares (colored paper) to the largest square.

（As shown in Figure 3）

第三關：

如圖（四）完成以上圖形拼圖，並思考『消失的面積』？完成回答問題，即可過關。

Stage 3：

Complete the puzzle as shown in Figure (4) and contemplate where the missing area . Once you've provided an answer to the question, you can pass this stage.

四、 原理探討 Discussion of principles

第一關：通過簡單的面積拼圖探討面積問題 Explore the area problem through a simple area puzzle

在這個階段，參與者的任務是將 1 至 5 號的拼圖排列成一個長方形。透過這個任務，鼓勵思考與面積相關的問題，例如不同形狀如何組合成更大的形狀，以及是否可以將第 6 塊拼圖加入現有的長方形中。這個階段引入了關於面積和空間推理的基本概念。

In this stage, the participant's task is to arrange the puzzle pieces numbered 1 to 5 into a rectangle. Through this task, you are encouraged to think about area-related questions, such as how different shapes can be combined into larger shapes and whether a 6th puzzle piece can be added to an existing rectangle. This stage introduces basic concepts about area and spatial reasoning.

第二關：通過面積拼圖理解畢氏定理 Understand the Pythagorean theorem through area puzzles

透過操作，將兩個較小的正方形拼圖（方格紙）移動並放入最大的正方形中。有助於理解畢氏定理的概念，可以具體看到較小的正方形如何放入較大的正方形中。

對於國中學生，透過操作，更加理解畢氏定理證明，該定理與直角三角形的三邊上所構建的正方形的面積有關。

By manipulation, move the two smaller square puzzle pieces (graph paper) into the largest square. helpful for understanding

The concept of Pythagorean Theorem can be seen specifically how a smaller square fits into a larger square.

For junior high school students, through operations, they can better understand the proof of Pythagorean theorem, which is related to the area of a square constructed on the three sides of a right triangle.

第三關：觀察面積差異並理解斜率的變化 Observe area differences and understand changes in slope

在這個階段，排列這些拼圖時，觀察並識別面積上的差異。提出該關卡的問題是消失的面積去了哪裡。這鼓勵參與者思考它們各自的面積及形狀的坡度的差異，以解決面積在視覺上的迷思問題。

At this stage, when arranging the pieces, observe and identify differences in area. The question posing this level is where the disappearing area went. This encourages participants to think about the differences in their respective areas and shapes' slopes to address the visual myth of area.

由以上關卡設計，這個活動旨在通過實際操作、互動的拼圖和任務，幫助學生更深入地理解幾何、畢氏定理推理以及與面積和斜率相關的數學概念。

Level 3:

Designed with the above levels, this activity aims to help students gain a deeper understanding of geometry, Pythagorean theorem reasoning, and mathematical concepts related to area and slope through hands-on, interactive puzzles and tasks.