

數學領域素養導向操作式課程實務研討



玩

台南市鹽水小學 何鳳珠

我的感悟……

- 老師有改變，家長、孩子會跟著改變
- 連結生活情境，讓孩子感悟原來上課所學的……
→ 用一雙數學眼看生活週遭
- 教師的專業……上下底面互相平行
- 媿恬為孩子做的記錄，內地教師也在做
- 相信孩子是有潛力的
- 年輕老師 & 資深老師的差異

藝術大師 羅丹 名言：

這個世界不是缺少美，而是缺少發現美的眼睛。

數學美嗎？



煎餃

盲1

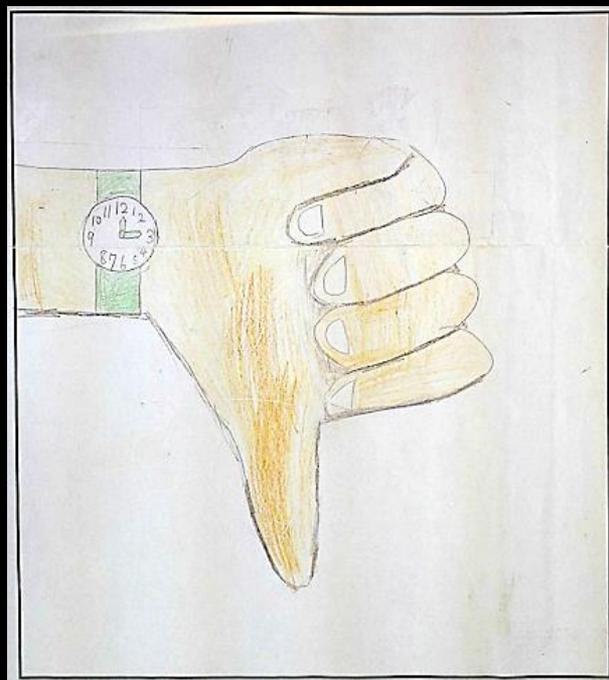
盲2

猜猜

英文

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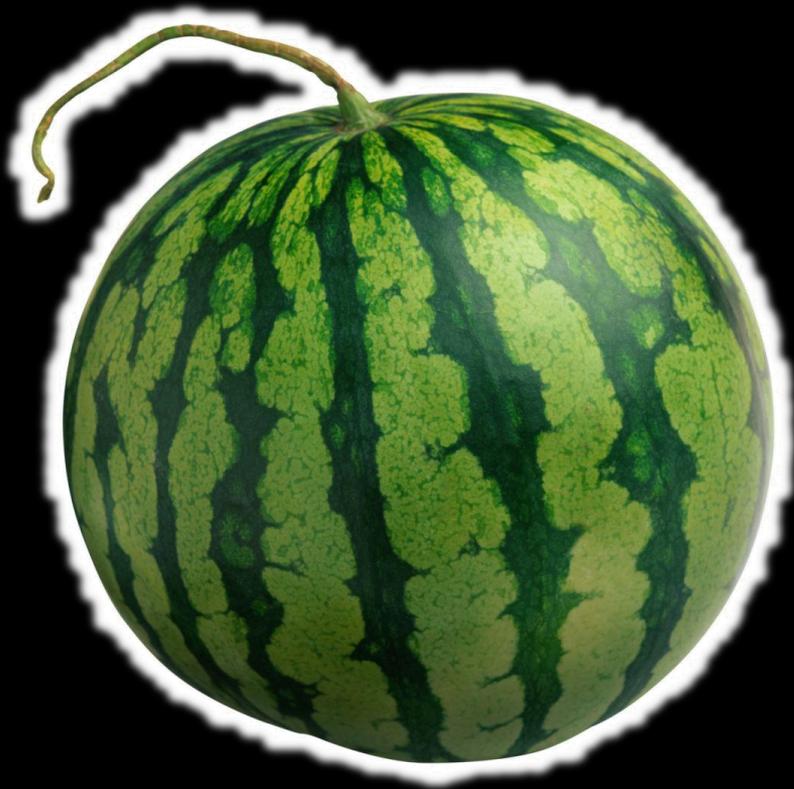
煎餃

盲1

盲2

猜猜

英文



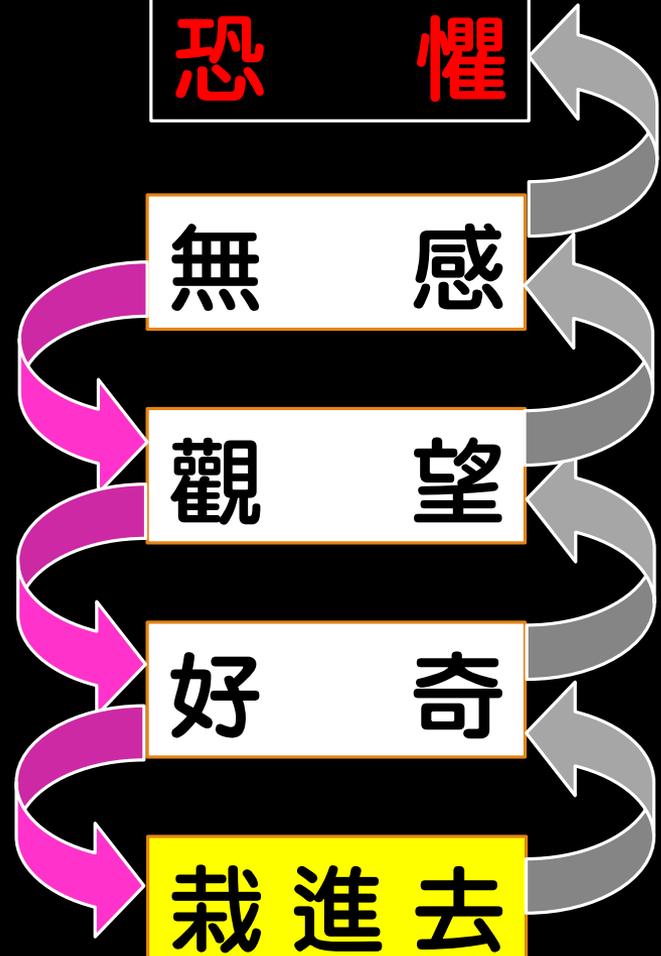
恐懼

無感

觀望

好奇

栽進去



煎餃

盲1

盲2

猜猜

英文

此地區為多雲

而北鄉

1 物羊 必要之時 拿出魄力 幸運 白色

高雄

「賣到沒人跟我買」煎包1顆2.5元 40年不漲

獨家

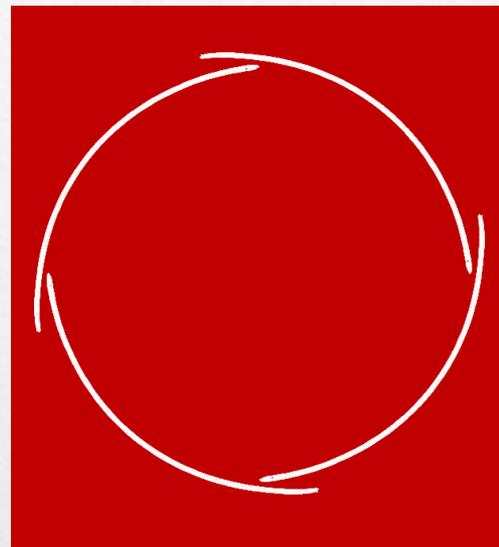
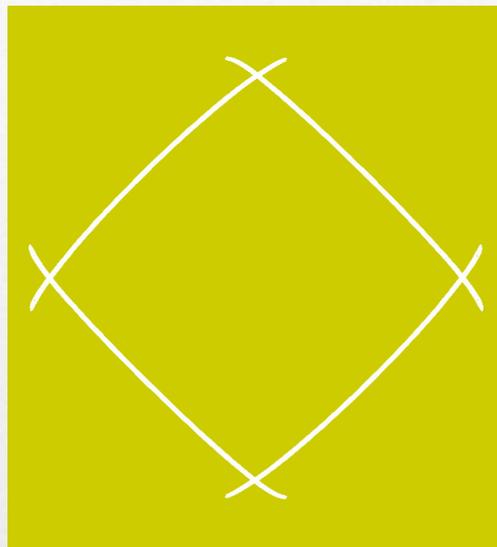
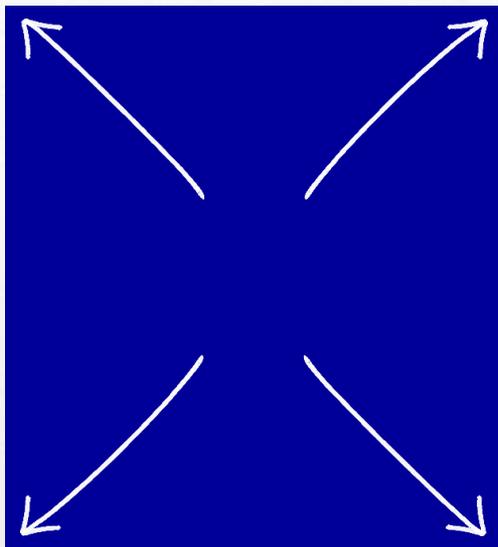
3 為兩萬價五然閱屋砍人 4 扣除額提高稅估少繳2千

十二年國教課程核心理念

自發

互動

共好



有意願

有動力

有知識

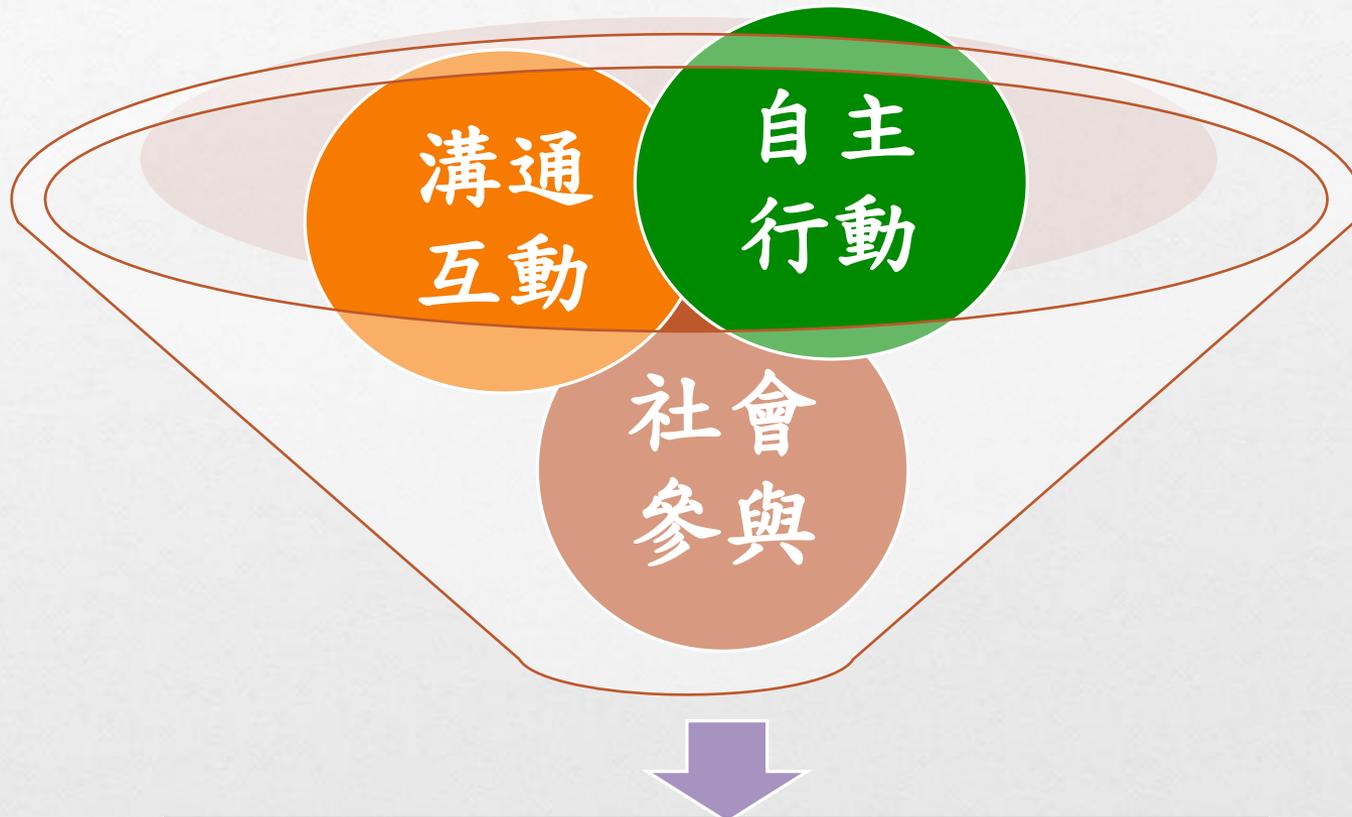
有方法

有善念

能活用



「**核心素養**」是指一個人為適應現在生活及面對**未來**挑戰，所應具備的**知識、能力與態度**。「核心素養」強調學習不宜以學科知識及技能為限，而應關注學習與**生活的結合**，透過**實踐力行**而彰顯學習者的**全人發展**。。



以人為本的**終身學習者**

總綱核心素養的三面九項內涵



自主行動

溝通互動

社會參與

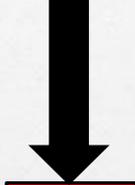
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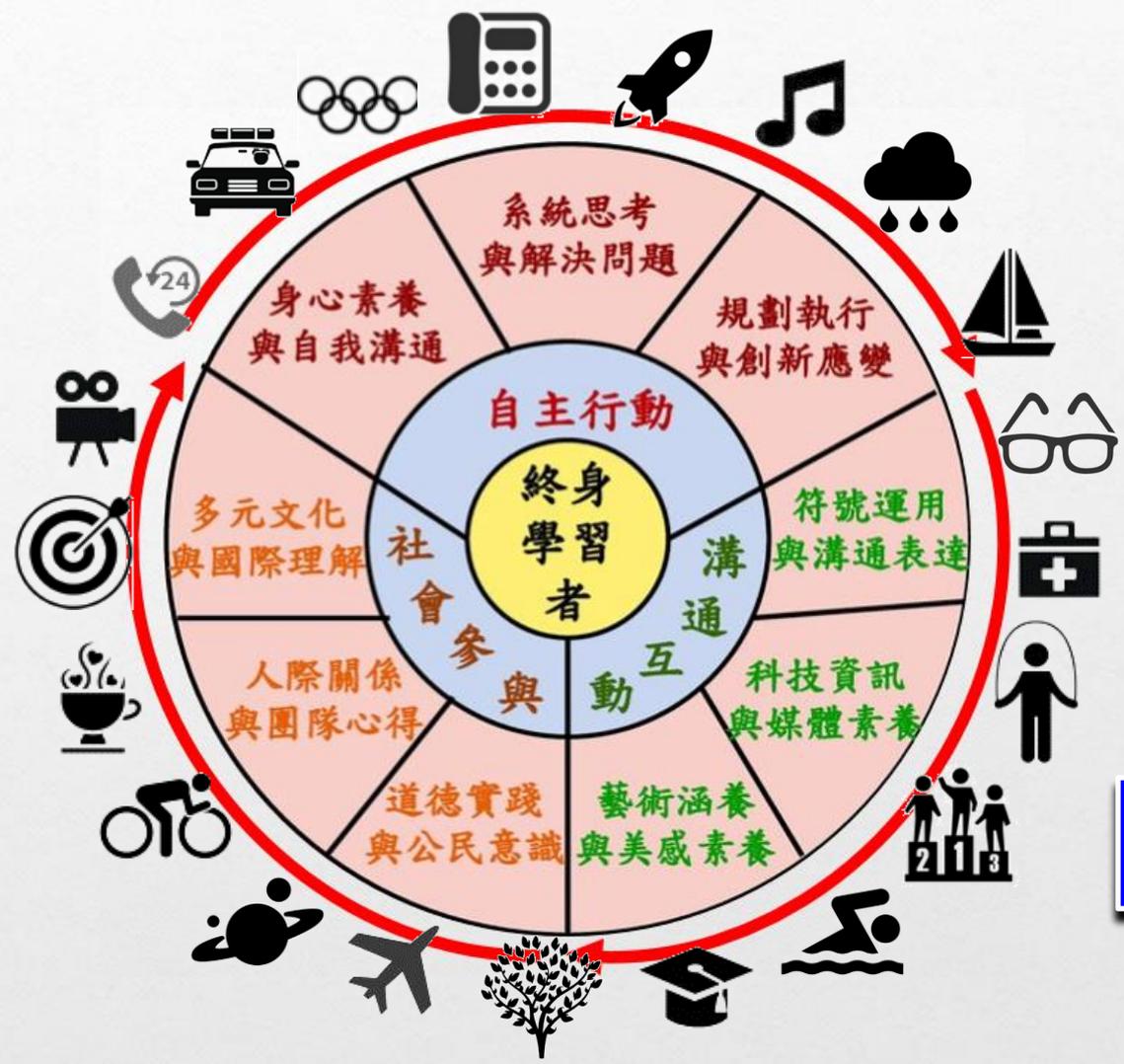
總綱核心素養的三面九項內涵

選

生活情境引入



解決生活問題



- 為何非教不可?
- 學這個有什麼重要性?

需求感



什麼是**核心素養**？跨越科目疆界、把知識用出來。

作者：陳雅慧

什麼是素養？

「是可以看到『學習遷移』的學習，譬如，知道數學知識可以怎麼用在地理或是物理上。」台中一中數學老師陳光鴻坦承，在沒有參加教師社群的課程共備之前，他其實不知道十幾年來教學生的數學知識除了對課堂和考試有用，還可以用在哪裡。

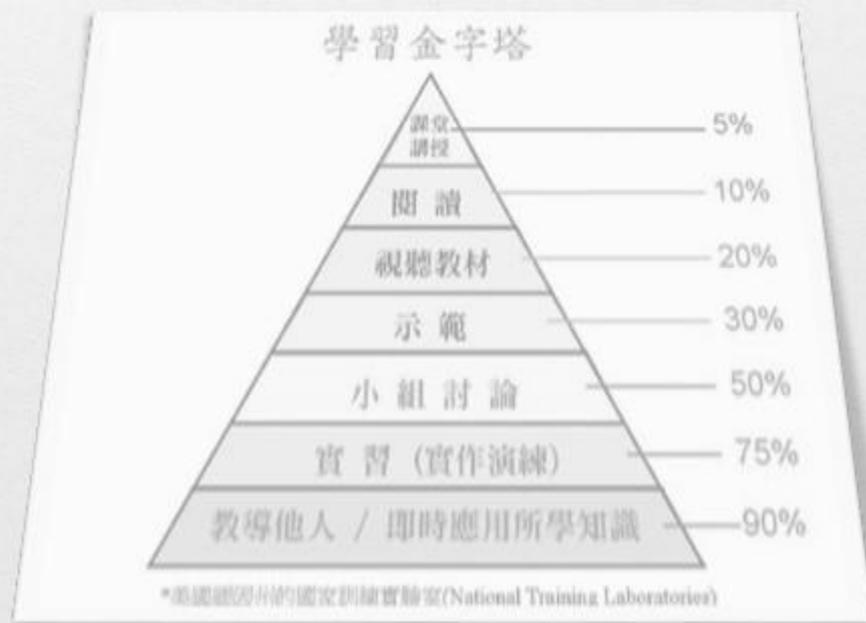
什麼是素養？「在真實的生活情境下，可以用出來的能力，」台北市育成高中國文老師鄭毓瓊說：「要解決真實的生活中遇到的問題，是不會分『科目』，必須把所有知識混在一起活用的。」

OECD：邁向2030年的教育架構

孩子應該要學什麼



以學生為本的課堂



學習吸引率金字塔

被動
學習

主動
學習



會 學

傾聽

分享

學 會

為什麼要學？

想 學

需求感



當 你能將你學會的東西

用很簡單的方式

把別人教會

讓別人一下子就能聽明白

那麼 你就是真學會了

課堂上最美的聲音是什麼？

哦！老師！老師！
我知道他的意思
了！他就是說…

哇，原來如此，
你太強了！

這裡我有疑問，
為什麼是……？



!?! 呀

煎餃

盲1

盲2

猜猜

英文

益智玩具轉化為教學活動



頂點珠造型棒



概念學習：骨架圖、形體認識

數學能力：空間幾何、數列規律



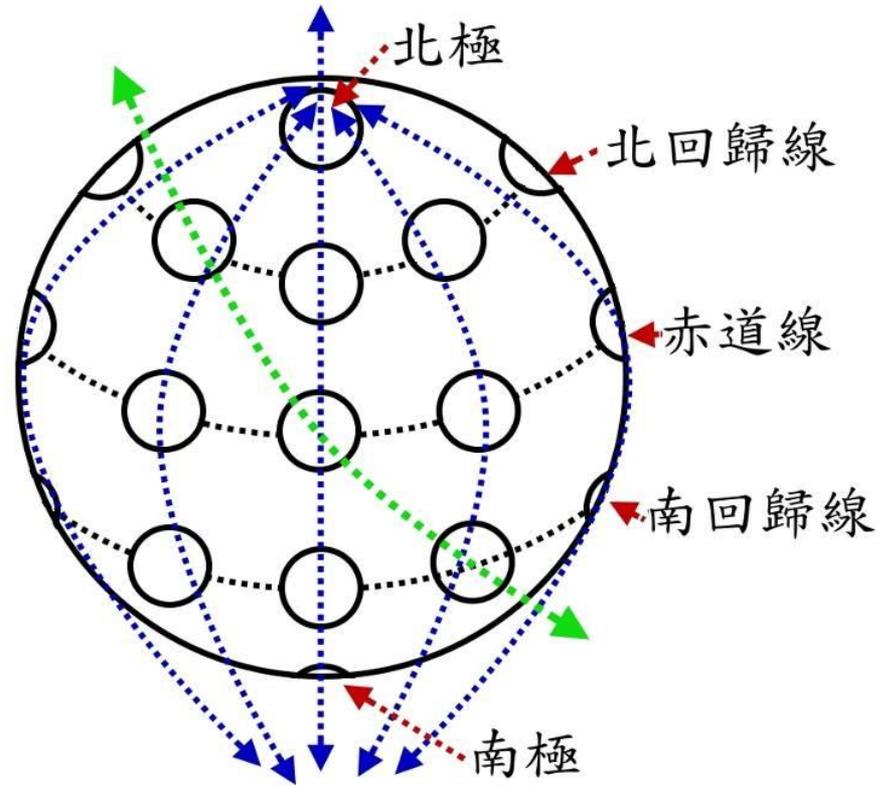
益智玩具轉化為教學活動



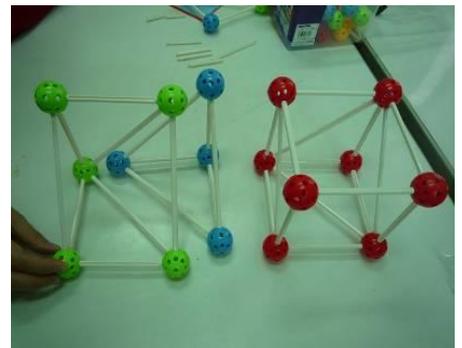
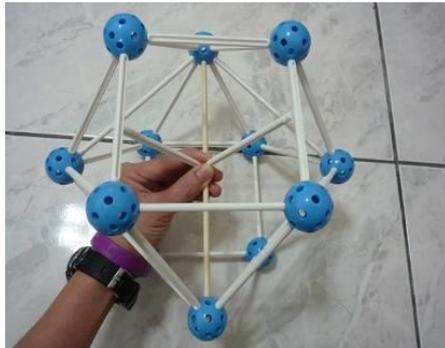
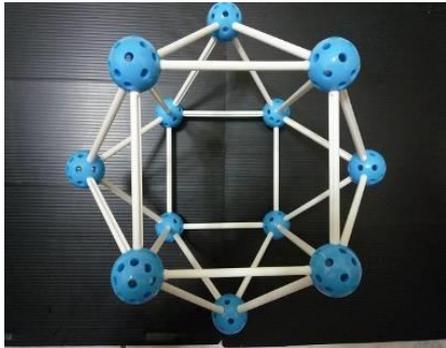
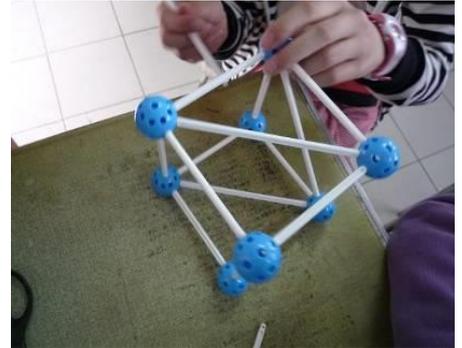
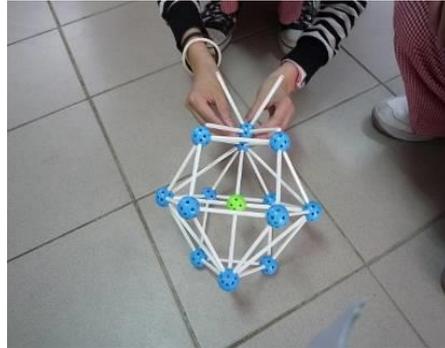
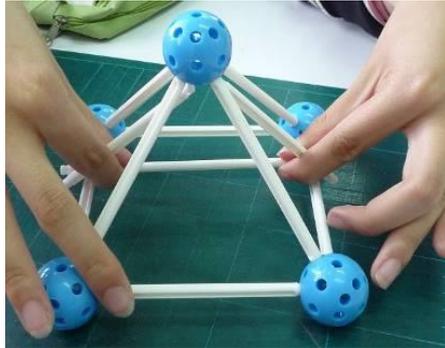
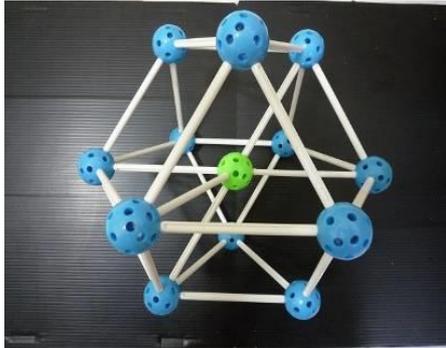
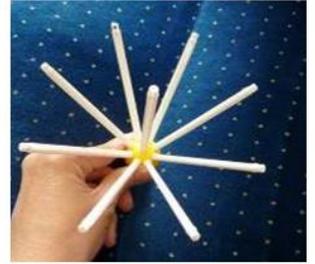
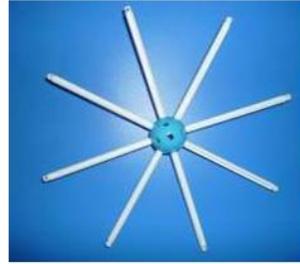
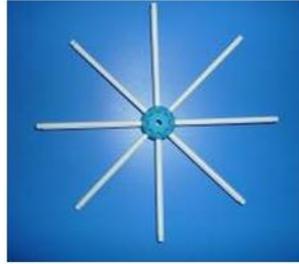
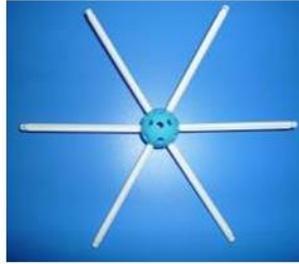
頂點珠造型棒



概念學習：骨架圖、形體認識
數學能力：空間幾何、數列規律



益智玩具轉化為教學活動



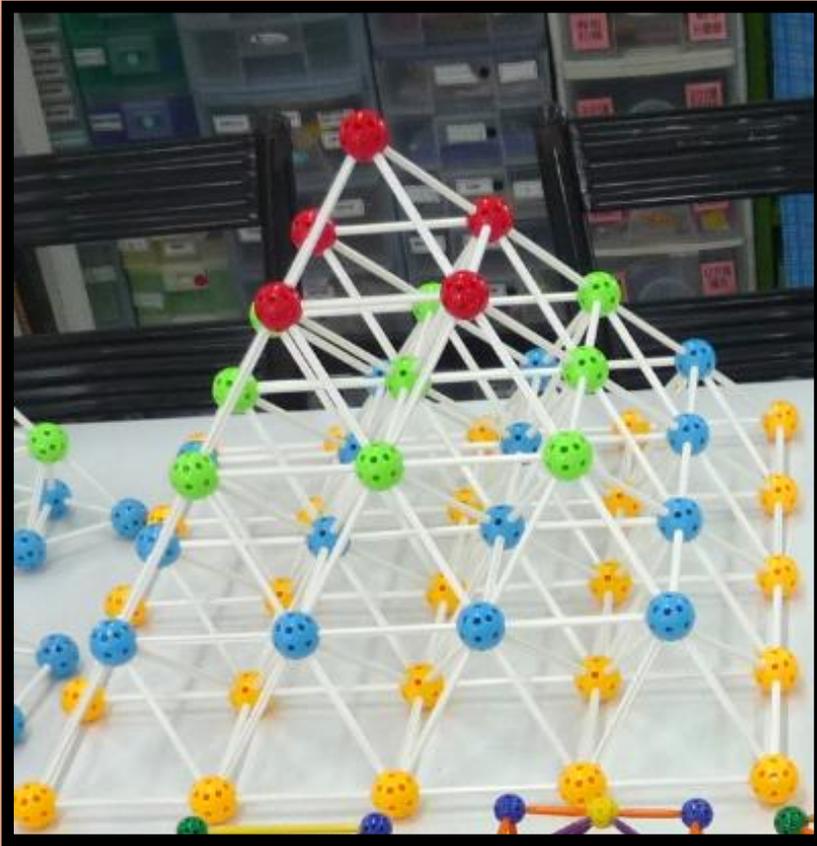
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概念學習：骨架圖、形體認識
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你看到什麼呢？



益智玩具轉化為教學活動

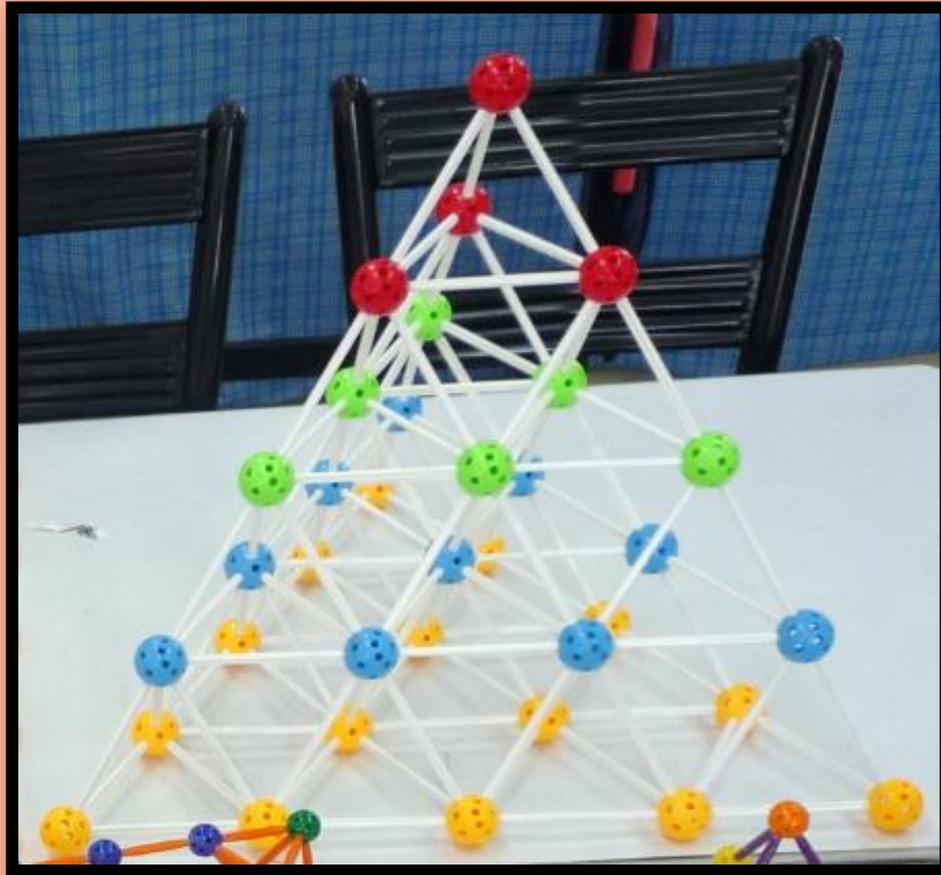


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概念學習：骨架圖、形體認識

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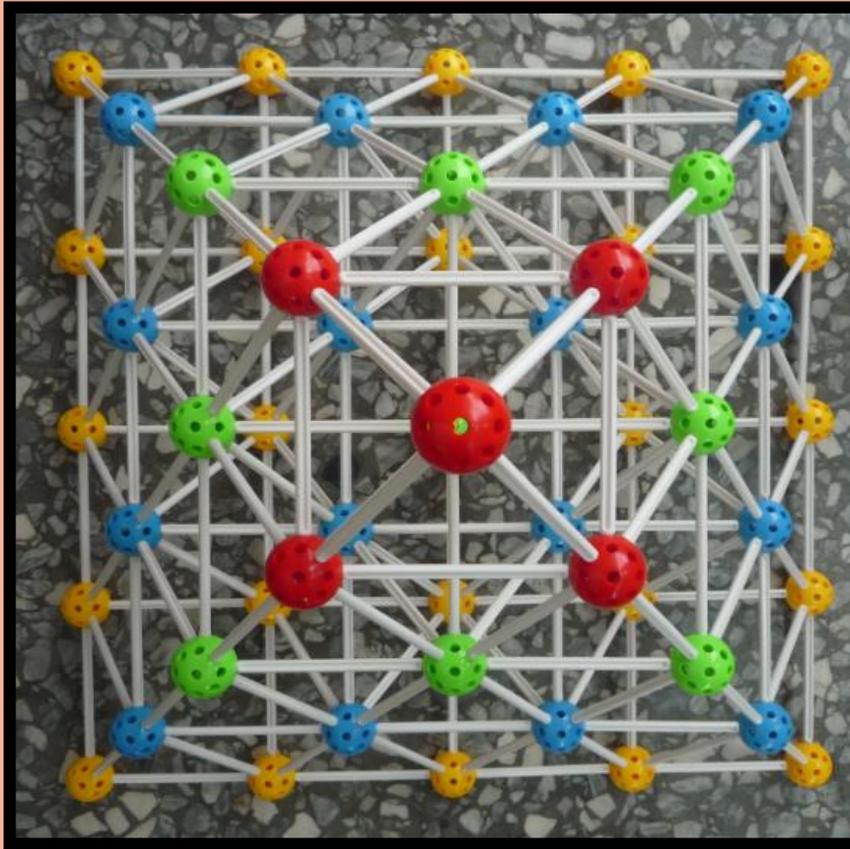


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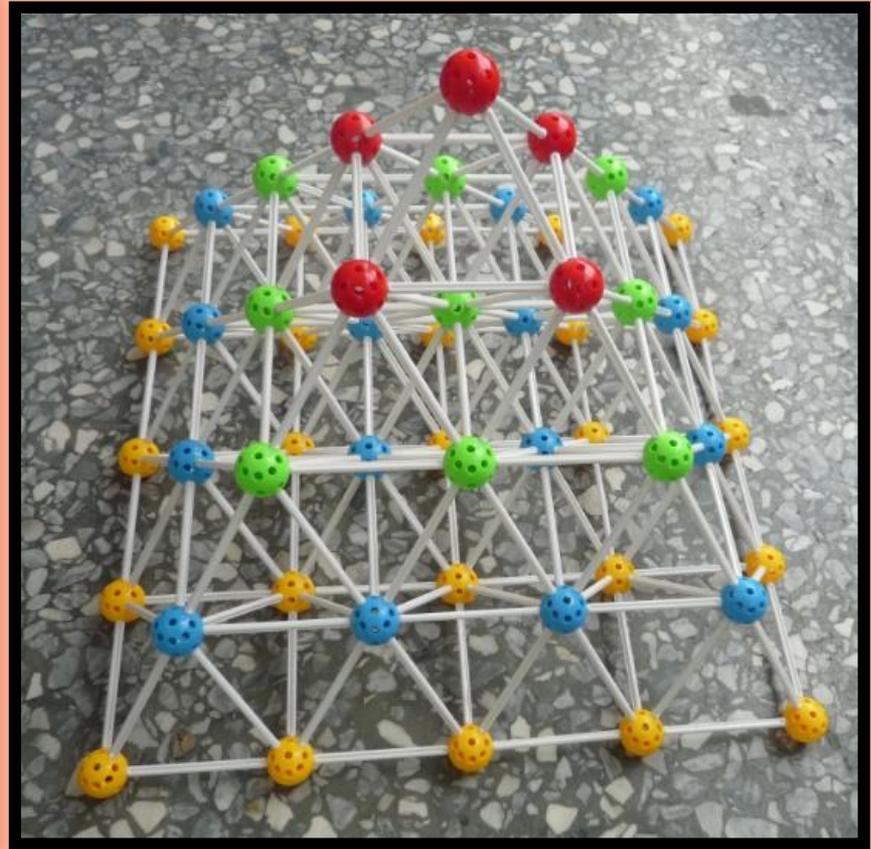


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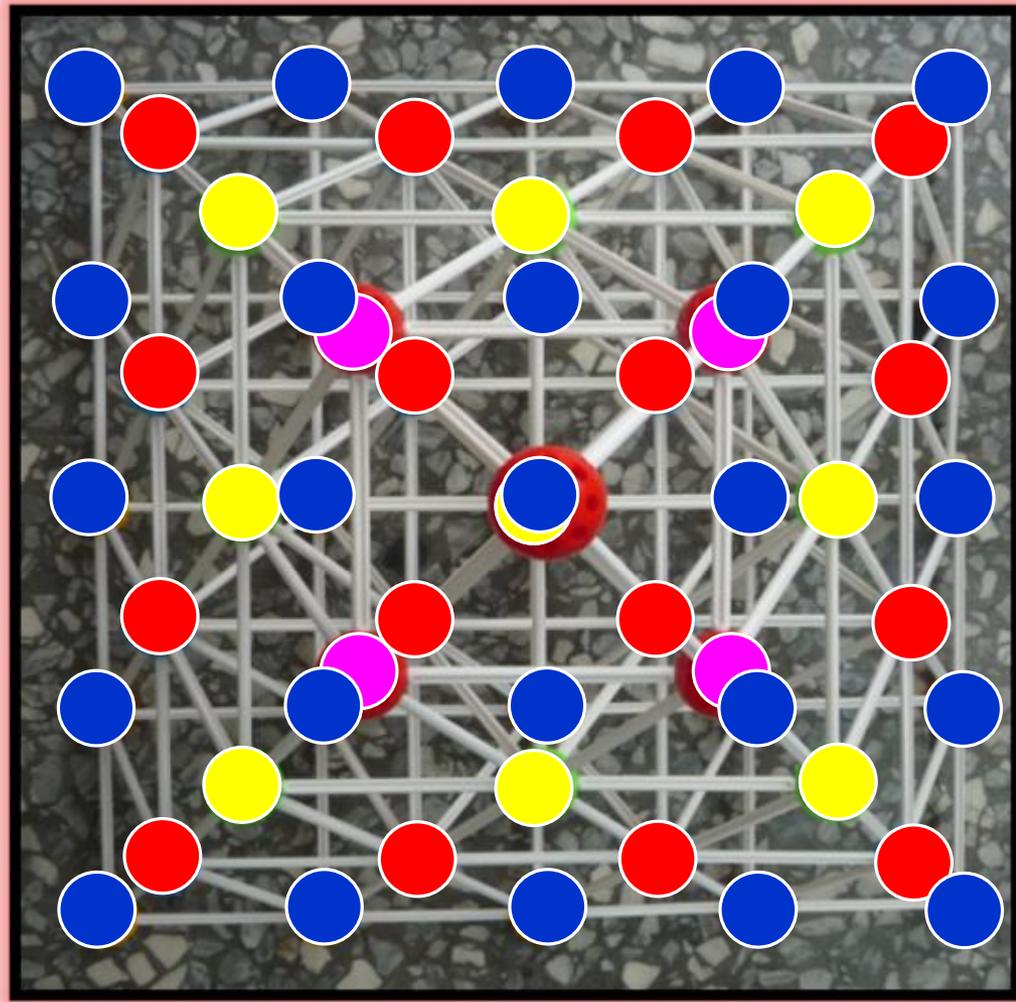
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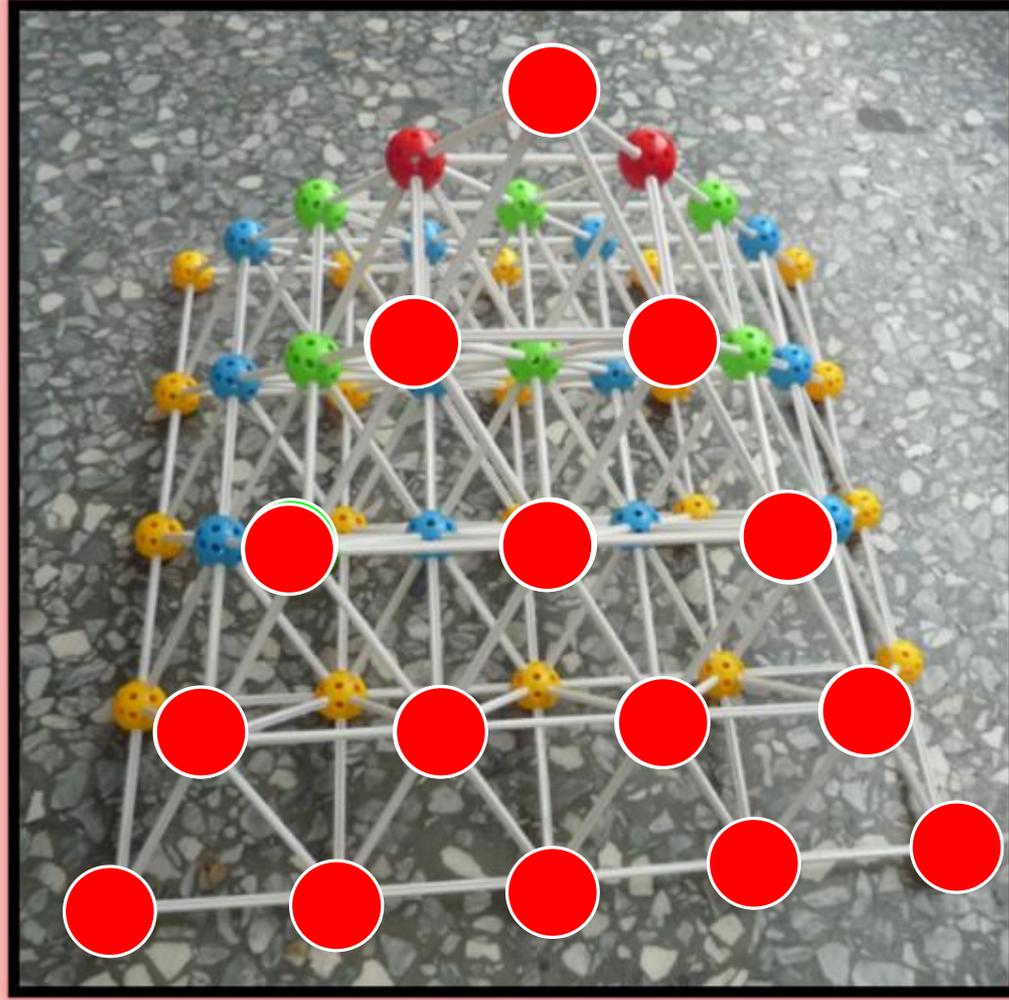
從側面拍



益智玩具轉化為教學活動



益智玩具轉化為教學活動



連環扣

~組數大挑戰~

原創：許文化老師

設計者：何鳳珠



数字逻辑盘

执教者：

台湾台南市盐水小学何凤珠



设计者：台南市盐水小学何凤珠



完美搶數

完 美 搶 數



台南市鹽水國小何鳳珠設計





3 × × ×	6 × × ×	9 ★ ×
4 × ×	7 ★	2 ★
1 ★	5 ×	8 ★

數字定位

台灣台南市鹽水小學
何鳳珠

參考資源來源：中華生活數學推廣學會(李勝義老師提供)、諾貝兒邏輯推理系列(數字篇)



邏輯推理【數字篇】



邏輯推理—數字遊戲任務迷宮



數學領域素養導向操作式課程實務研討



玩

台南市鹽水小學 何鳳珠

煎餃

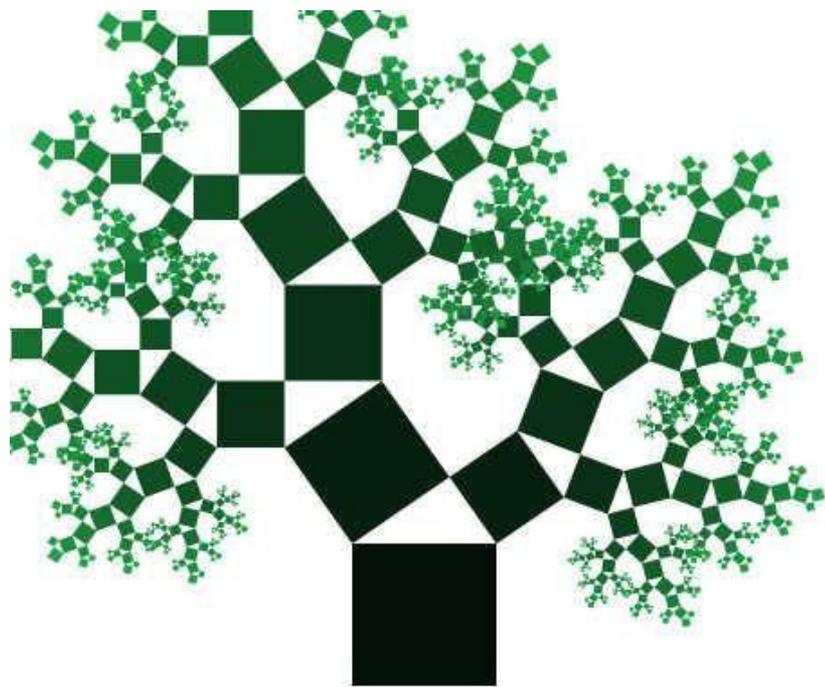
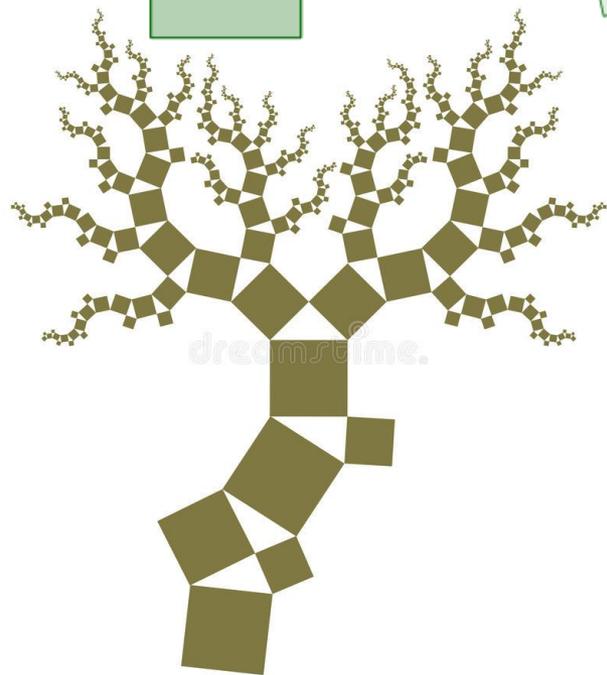
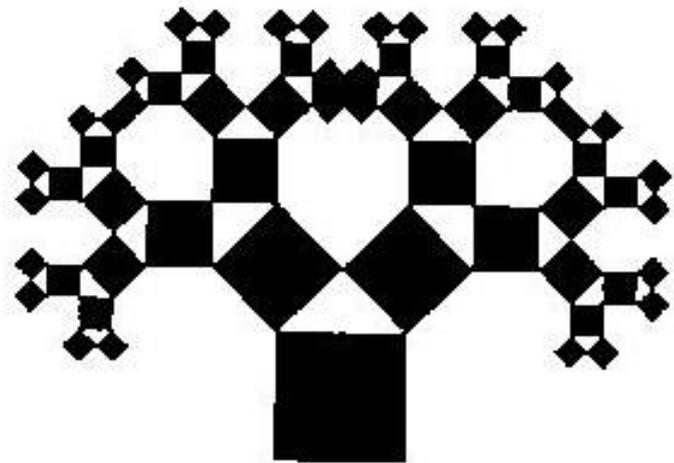
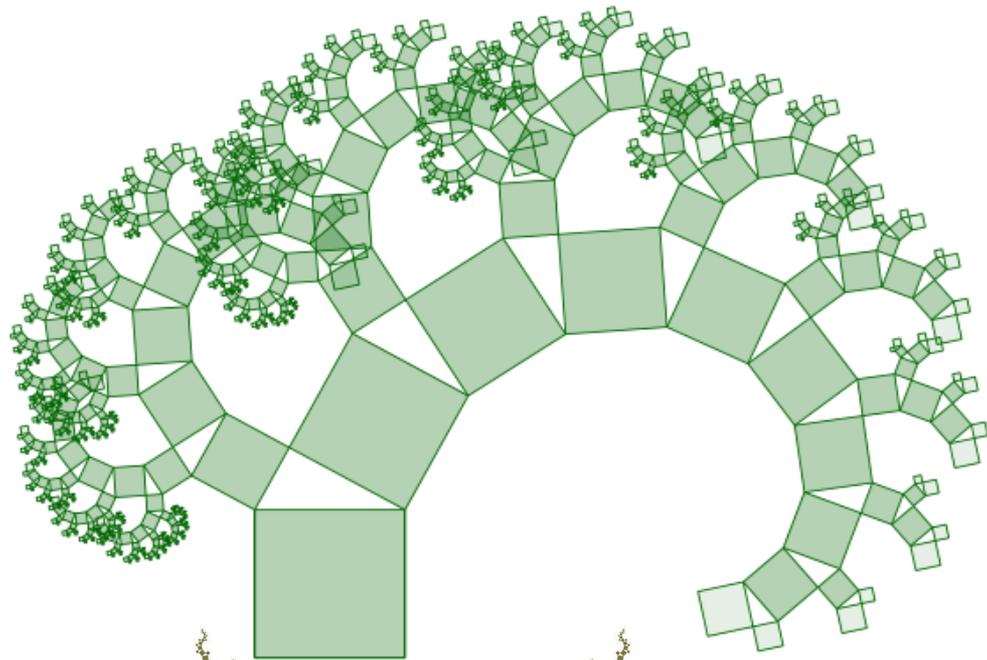
盲1

盲2

猜猜

英文





益智玩具轉化為教學活動



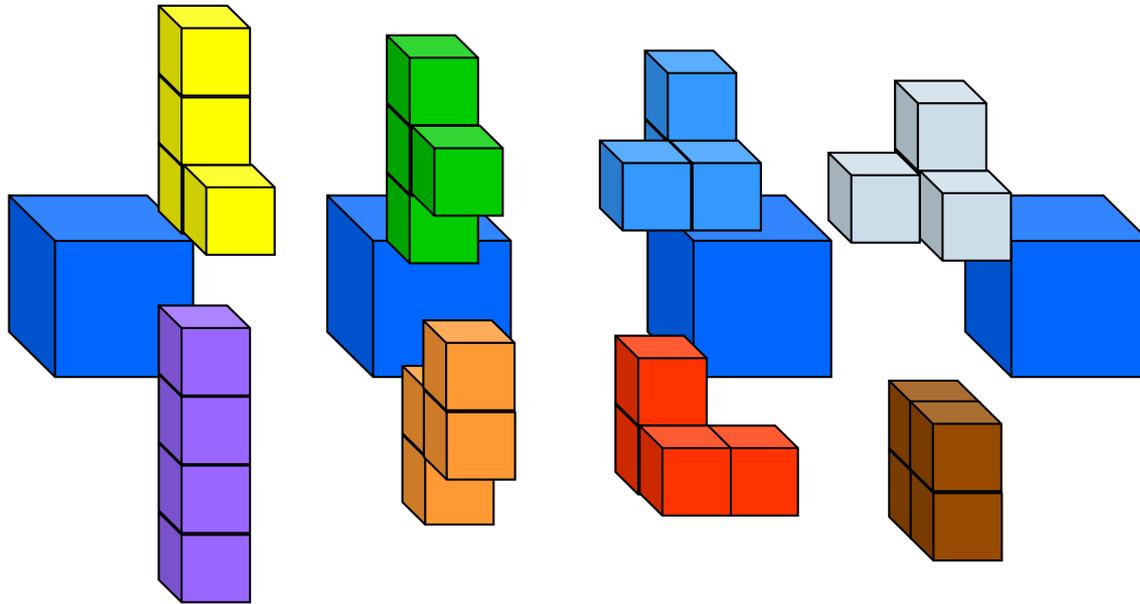
立方塊



概念學習：立體視圖、對稱

數學能力：空間幾何

◆ 用四個立方塊可以排出幾種造型？



益智玩具轉化為教學活動



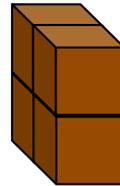
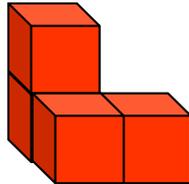
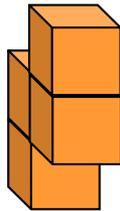
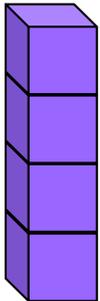
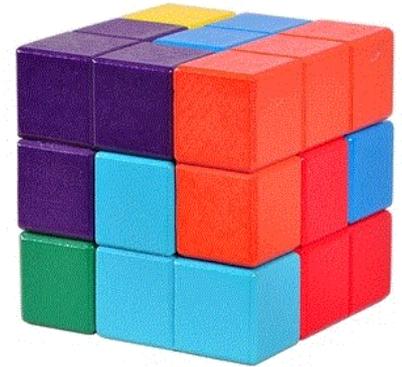
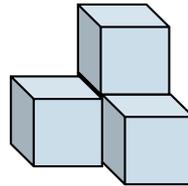
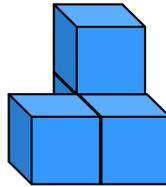
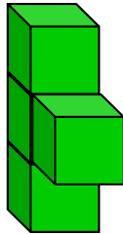
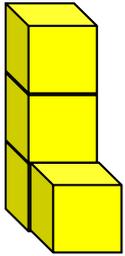
立方塊



概念學習：立體視圖、對稱

數學能力：空間幾何

◆ 用這8個元件可以排出右邊的正立方體嗎？



$$4 \times 8 = 32$$

27



益智玩具轉化為教學活動

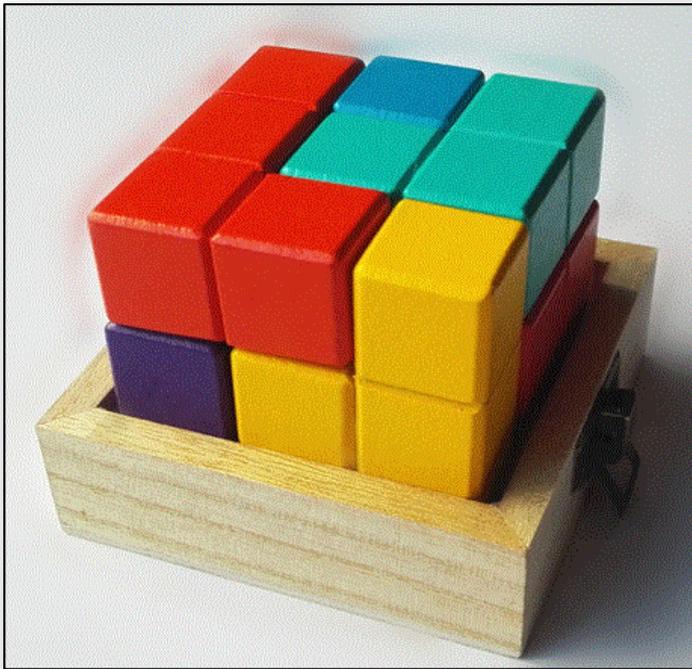


立方塊



概念學習：立體視圖、對稱
數學能力：空間幾何

索瑪立方塊



九色魔方



益智玩具轉化為教學活動



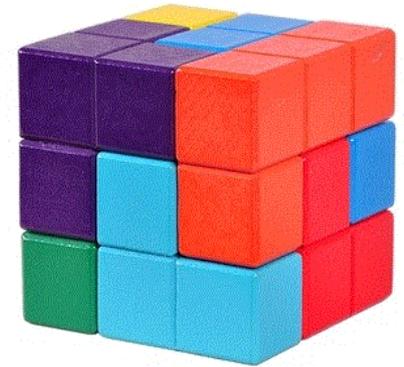
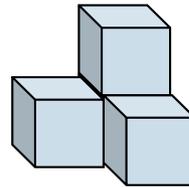
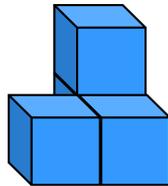
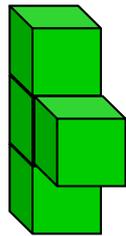
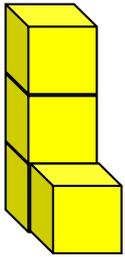
立方塊



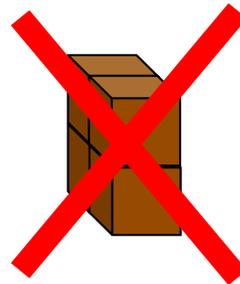
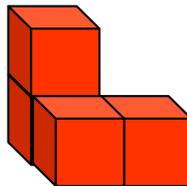
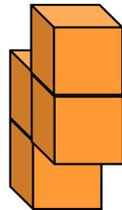
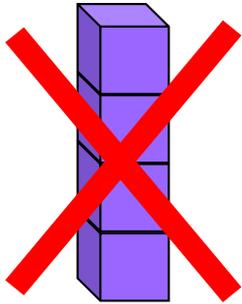
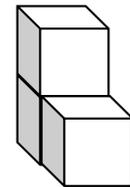
概念學習：立體視圖、對稱

數學能力：空間幾何

索瑪立方塊



+



益智玩具轉化為教學活動



立方塊



概念學習：立體視圖、對稱
數學能力：空間幾何

-巴比倫空間邏輯方塊-

九色魔方

和索瑪有何不同？



益智玩具轉化為教學活動



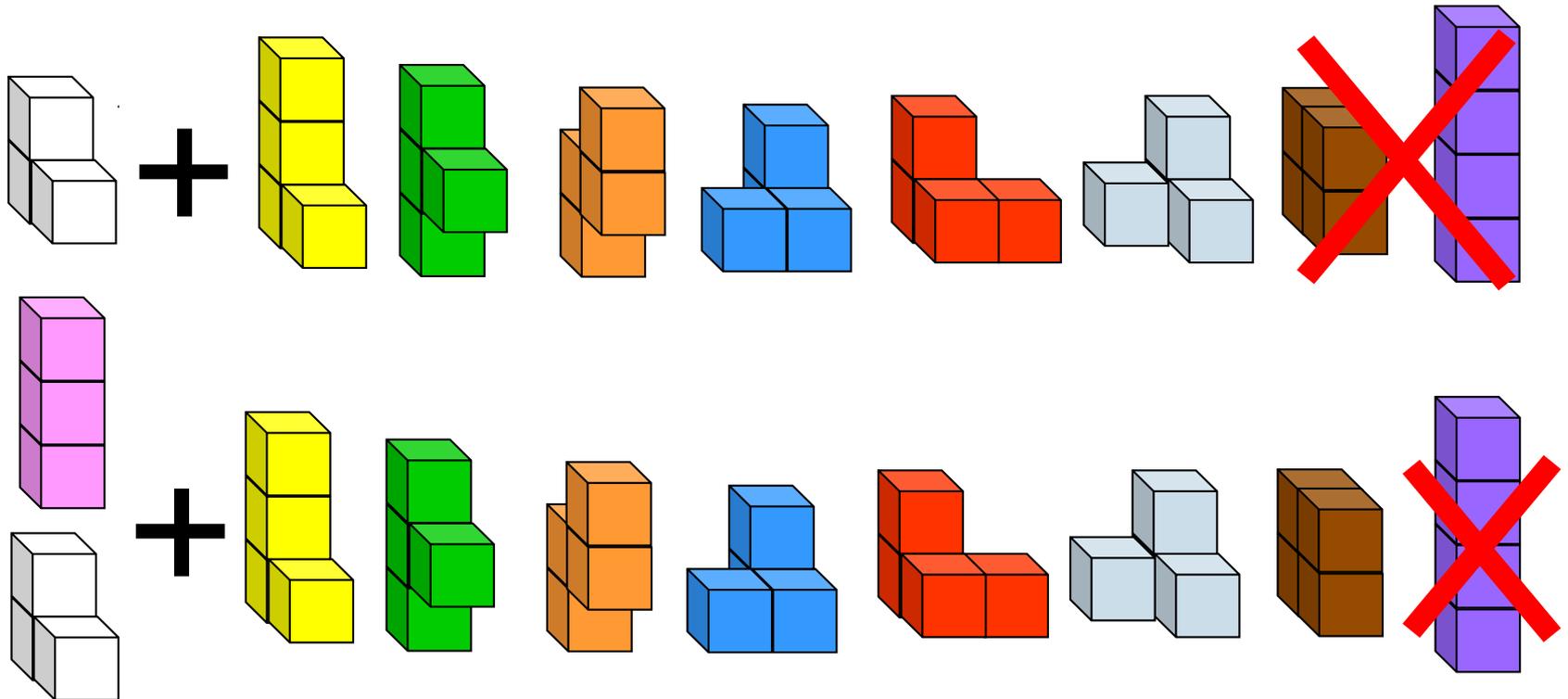
立方塊



概念學習：立體視圖、對稱

數學能力：空間幾何

◆ 索瑪立方塊 & 九色魔方



益智玩具轉化為教學活動



立方塊

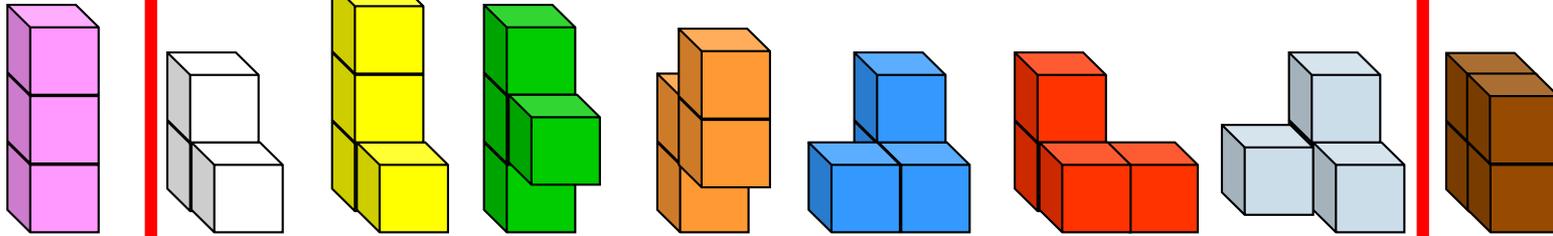


概念學習：立體視圖、對稱

數學能力：空間幾何

九色魔方

找出索瑪立方塊
的七個元件。



益智玩具轉化為教學活動



立方塊

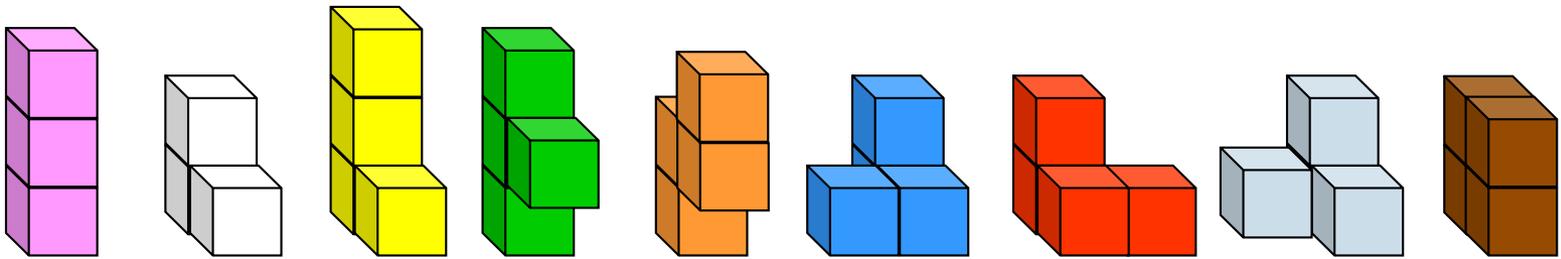


概念學習：立體視圖、對稱

數學能力：空間幾何



繪製立體視圖



0	1	2	3	4	5	6	7	8





◆ 我的師父—李勝義老師

中華生活數學推廣學會理事長

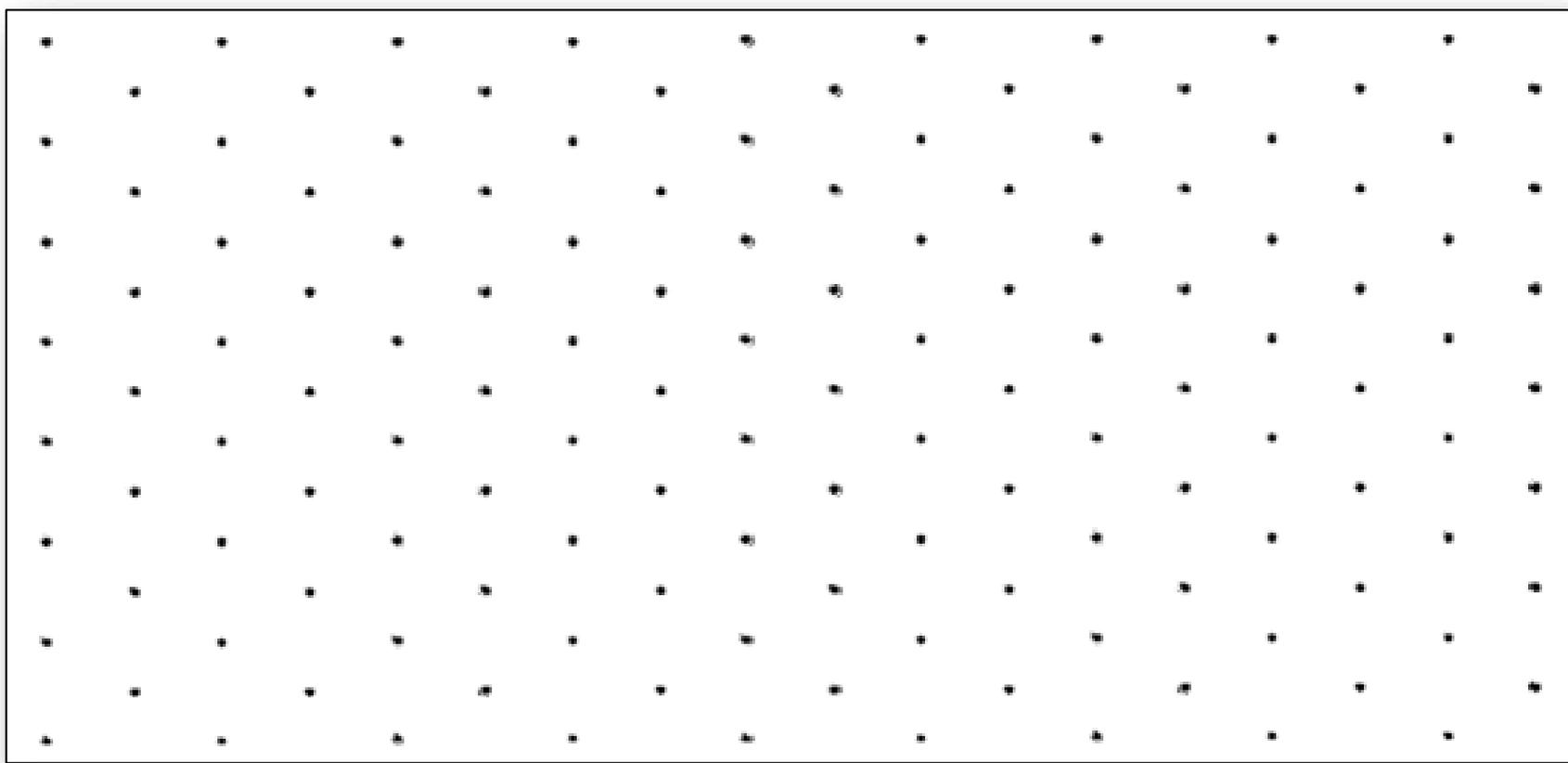


益智玩具轉化為教學活動



九色魔方

◆ 正Y & 倒Y的變化



益智玩具轉化為教學活動



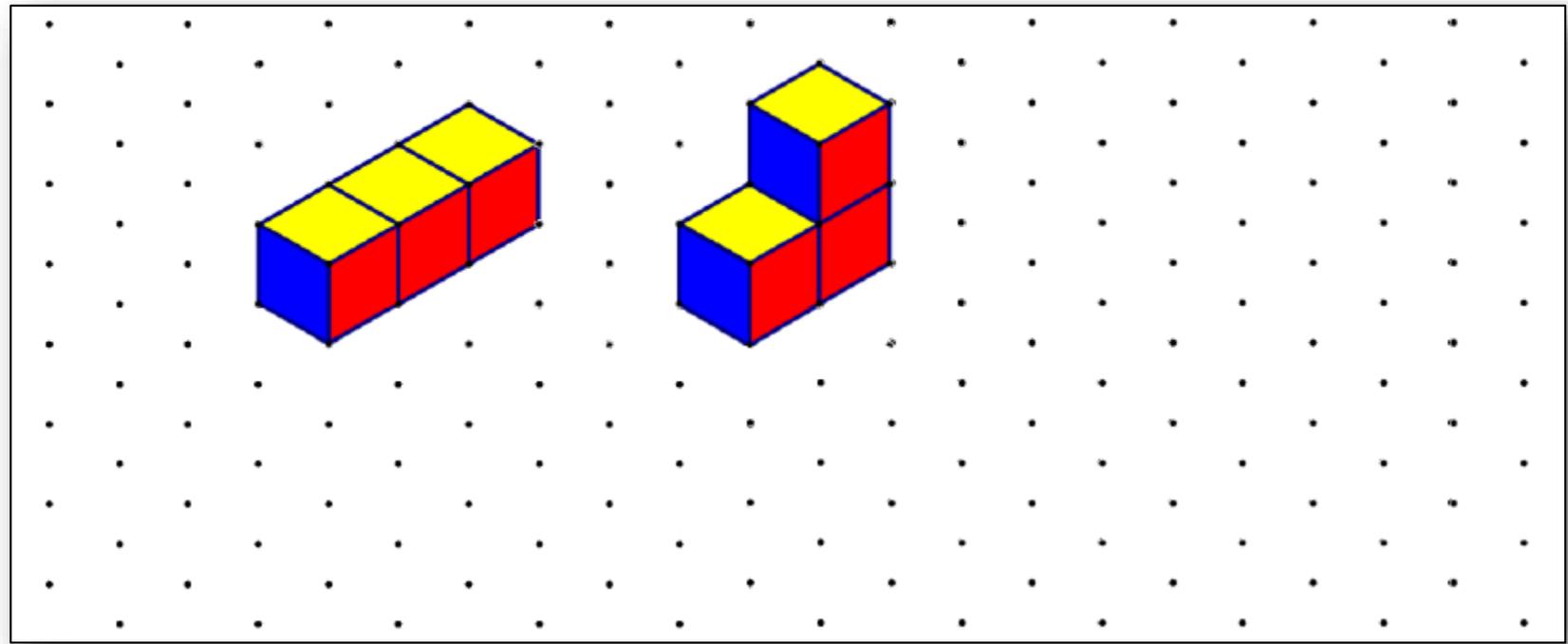
立方塊



概念學習：立體視圖、對稱
數學能力：空間幾何



繪製立體視圖



益智玩具轉化為教學活動

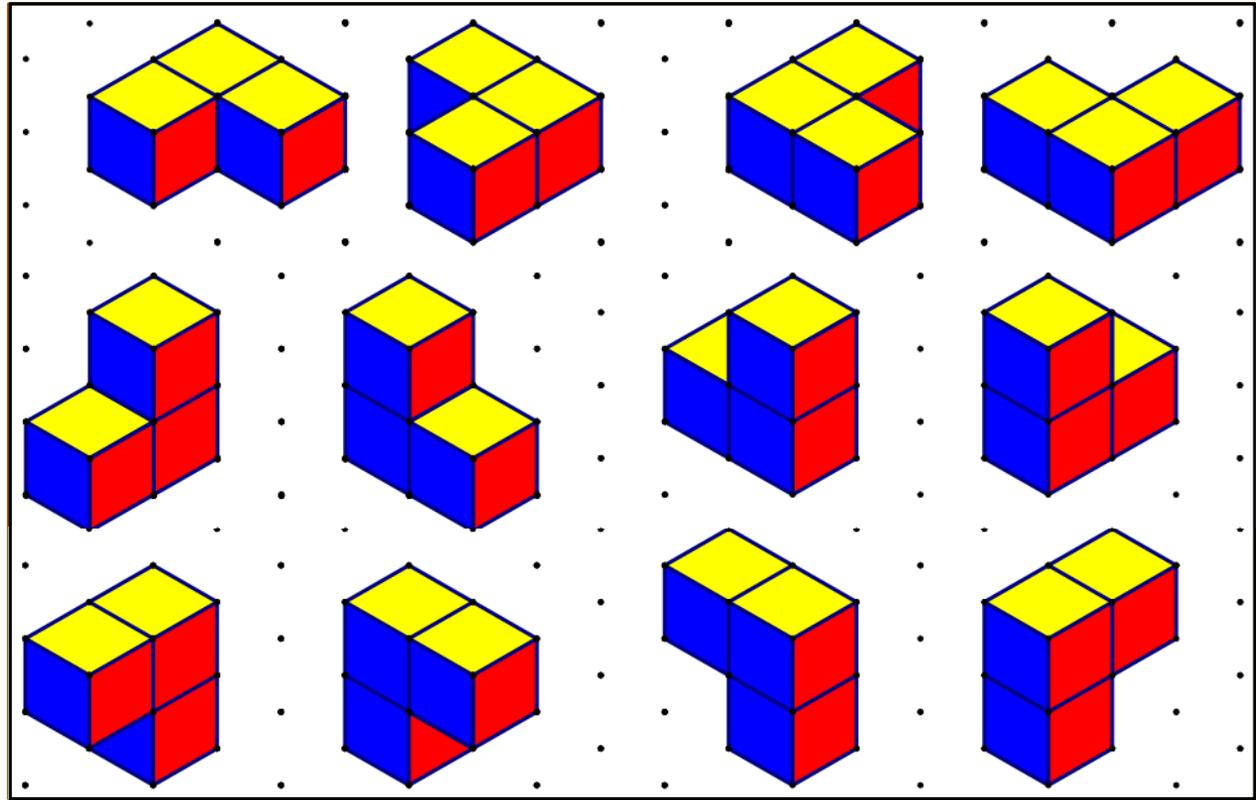
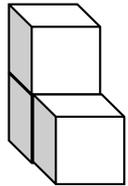


立方塊



概念學習：立體視圖、對稱

數學能力：空間幾何



益智玩具轉化為教學活動



九色魔方



左右各抽走一個，其餘的可以組成一個正方體。

Diagram illustrating the 9 cube shapes (numbered 2 to 10) and their combination to form a larger cube. The shapes are arranged in a 3x3 grid:

- Row 1: Shape 8 (brown, 2x2x1), Shape 5 (blue, 2x2x1), Shape 7 (light blue, 2x2x1)
- Row 2: Shape 3 (green, 3x1x1, highlighted with a red box), Shape 2 (yellow, 3x1x1), Shape 4 (orange, 2x2x1)
- Row 3: Shape 6 (red, 2x2x1), Shape 1 (white, 2x1x1), Shape 0 (pink, 3x1x1)

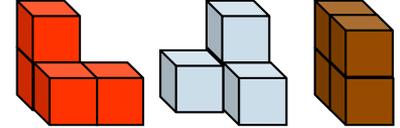
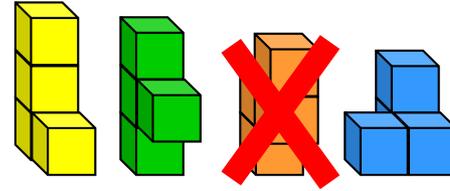
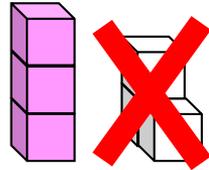
Arrows indicate that shapes 7 and 10 are removed, and the remaining shapes (2, 3, 4, 5, 6, 8) are used to form a larger cube. The text below states: **※可以搭配2顆骰子※**



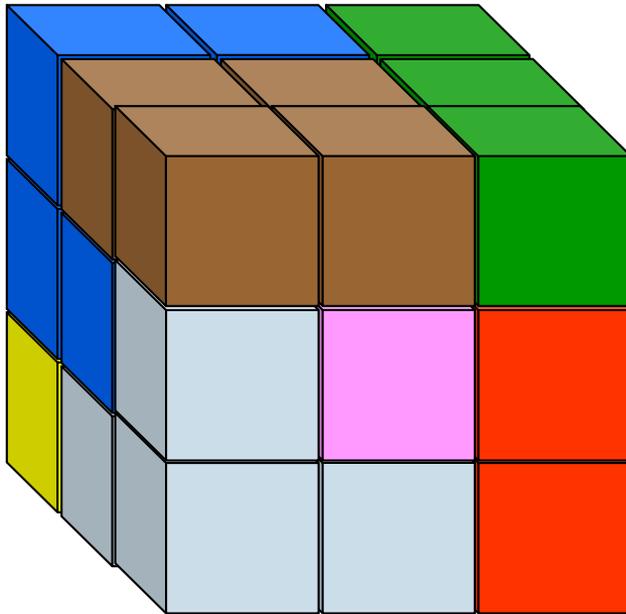
益智玩具轉化為教學活動



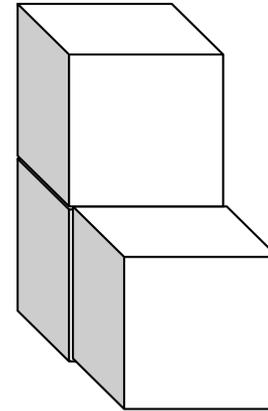
九色魔方



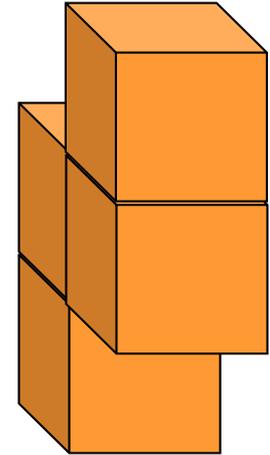
◆ 九色魔方拼組範例



1



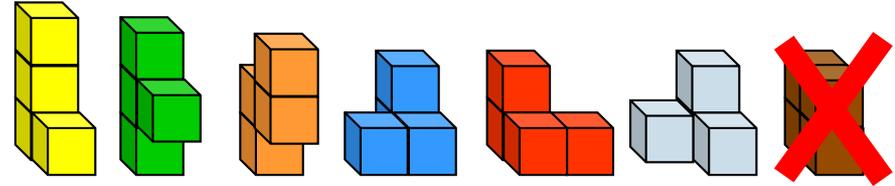
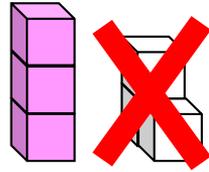
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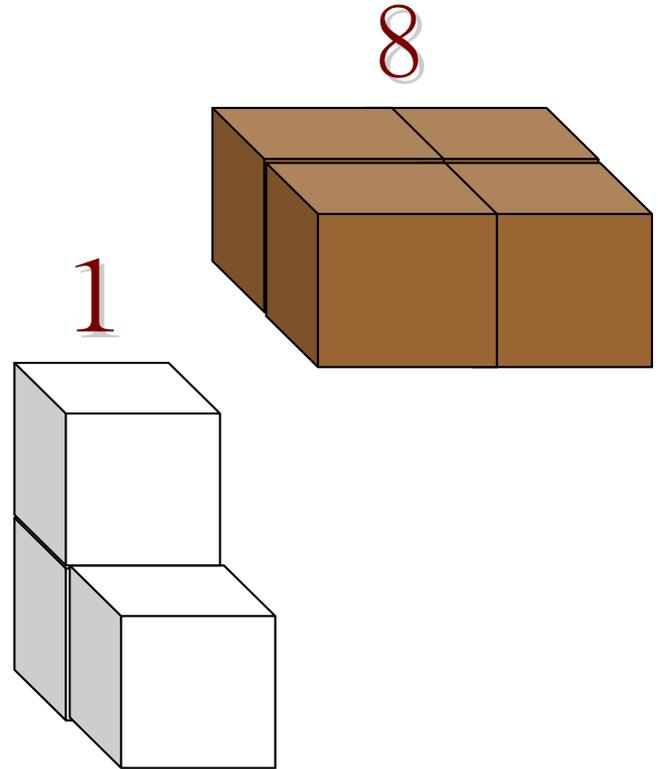
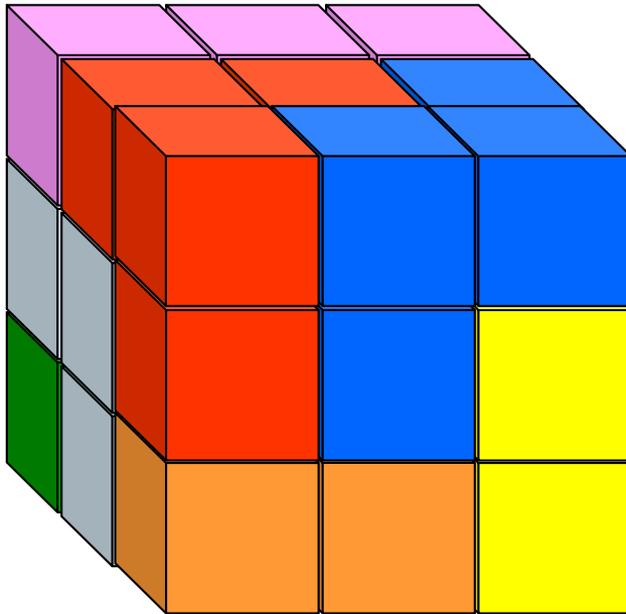
益智玩具轉化為教學活動



九色魔方



◆ 九色魔方拼組範例



益智玩具轉化為教學活動



九色魔方



這裡有正方形



正方體



兄弟比賽



逆向思維



益智玩具轉化為教學活動



九色魔方

缺 0、2	缺 0、4	缺 0、5

九色魔方 - 记录单

设计者：台南市盐水小学何凤珠

0	1	2	3	4	5	6	7	8

缺 0、2	缺 0、4	缺 0、5	缺 0、6	0、7	缺 0、8

缺 1、2	缺 1、4	缺 1、5	缺 1、6	缺 1、7	缺 1、8

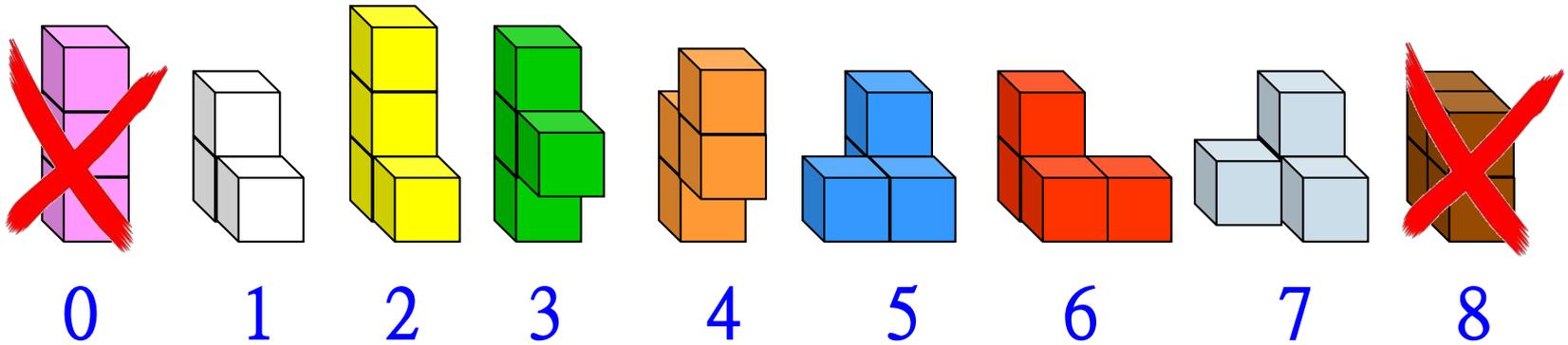


益智玩具轉化為教學活動

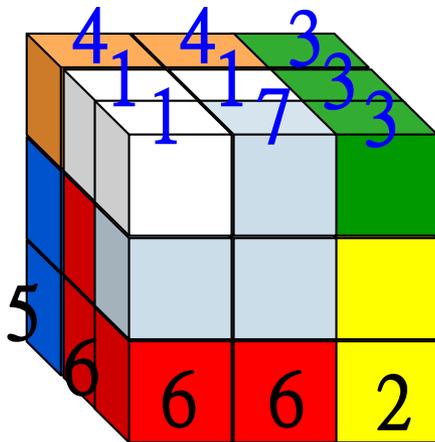


九色魔方

◆ 魔方的記錄語言



0 1 2 3 4 5 6 7 8



上層

中層

下層

4	4	3
1	1	3
1	7	3

5	4	4
6	7	3
7	7	2

5	5	2
6	5	2
6	6	2

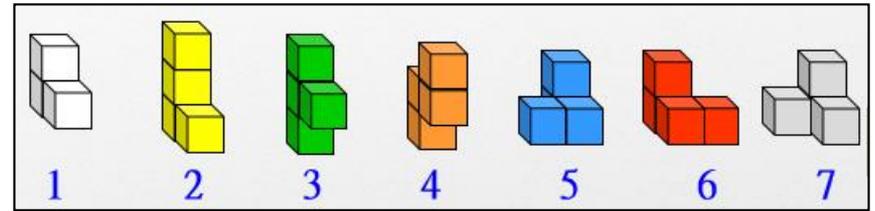


益智玩具轉化為教學活動



九色魔方

◆ 記錄語言 → 原模型



2	2	3
1	1	3
1	4	3

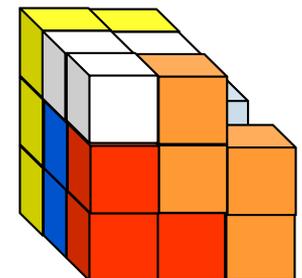
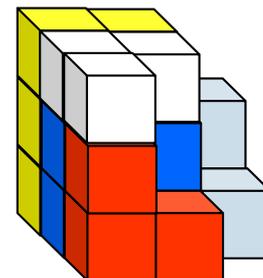
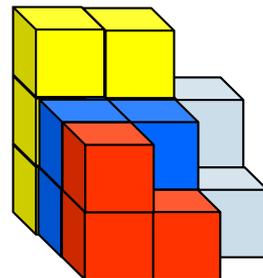
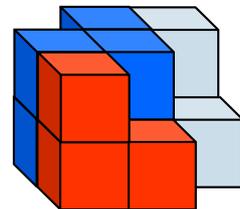
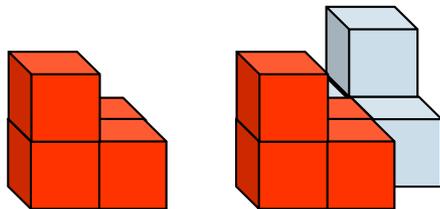
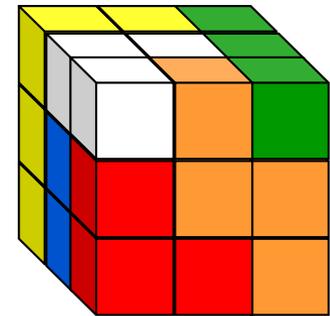
【上層】

2	5	7
5	5	3
6	4	4

【中層】

2	7	7
5	6	7
6	6	4

【下層】



益智玩具轉化為教學活動



九色魔方

◆ 排一排、畫一畫

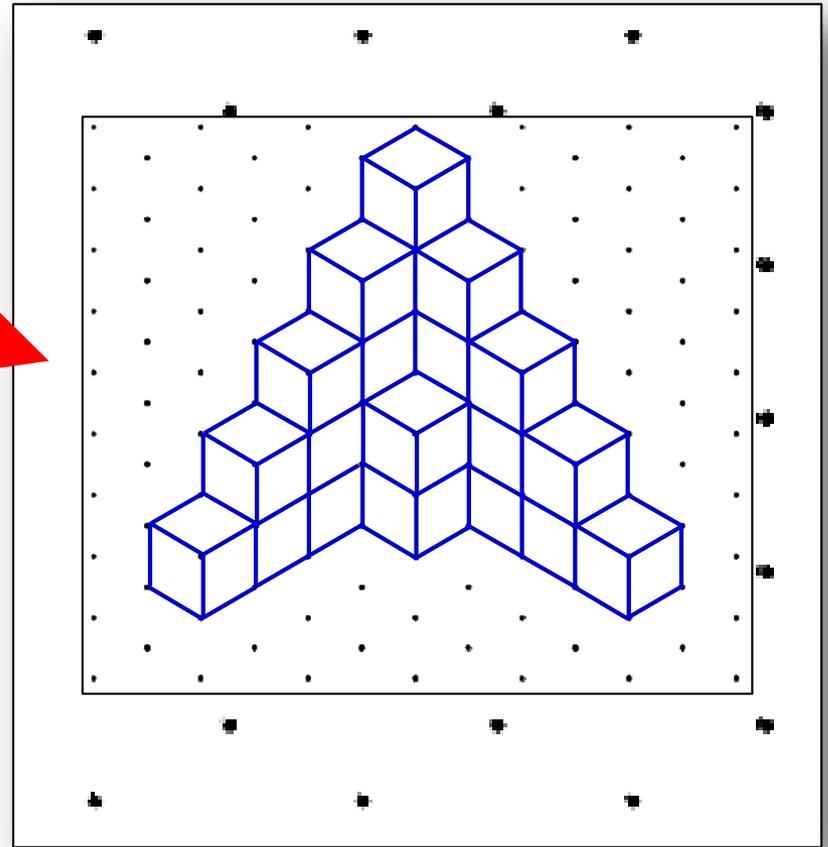


益智玩具轉化為教學活動



九色魔方

◆ 排一排、畫一畫

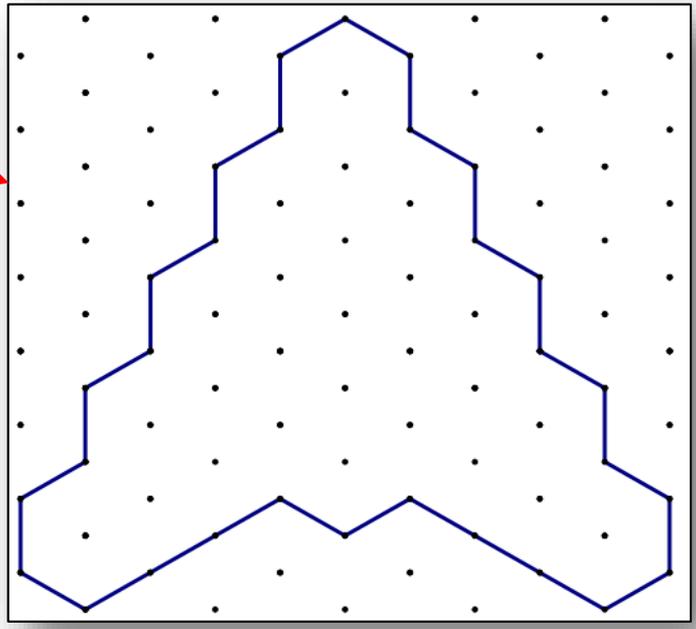


益智玩具轉化為教學活動



九色魔方

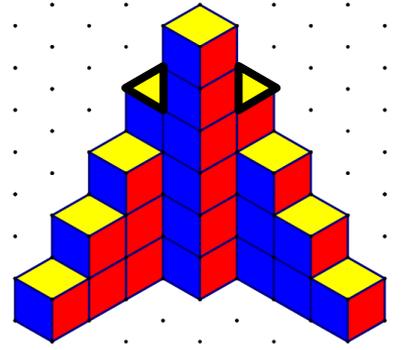
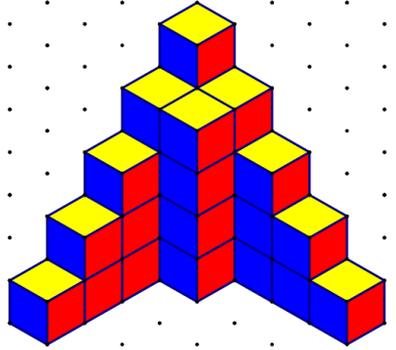
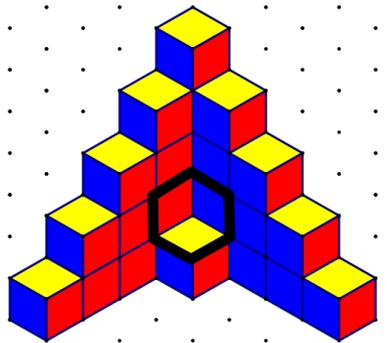
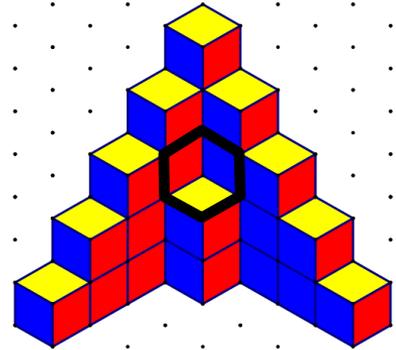
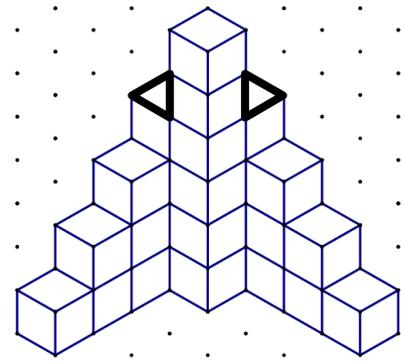
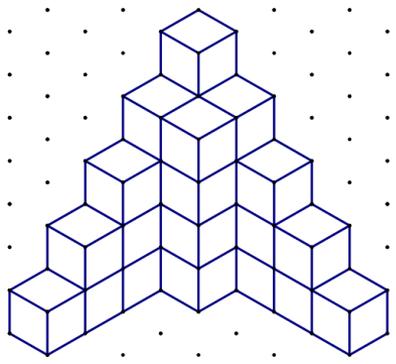
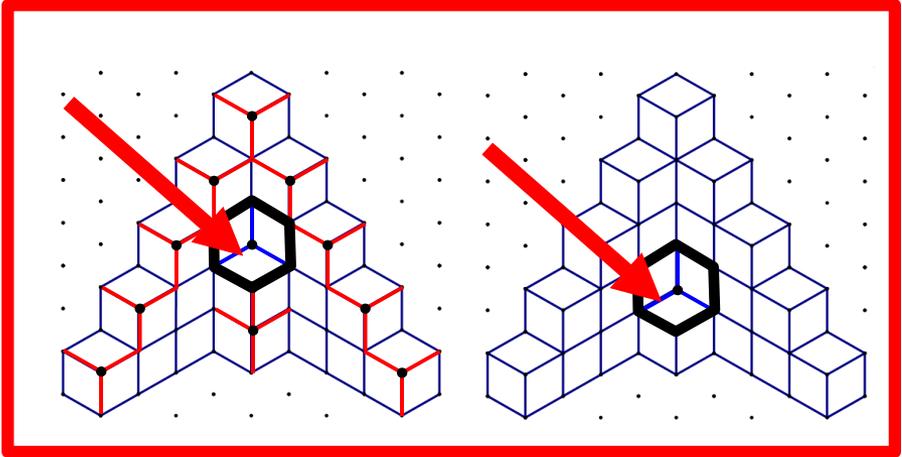
◆ 排一排、畫輪廓



益智玩具轉化為教學活動



九色魔方 ◆ 畫一畫 (正Y、倒Y)、塗一塗

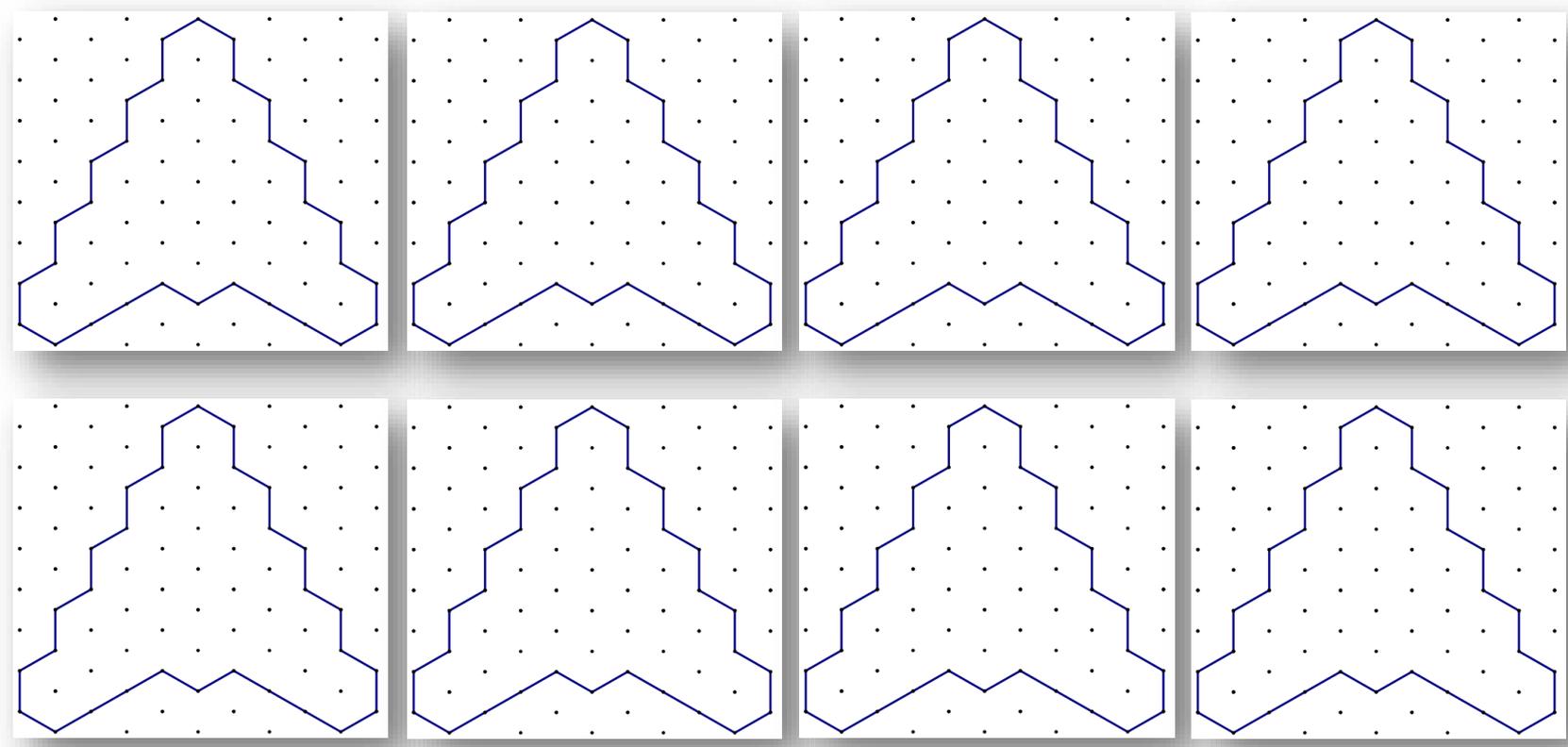


益智玩具轉化為教學活動



九色魔方

◆ 你能變出多少種呢？

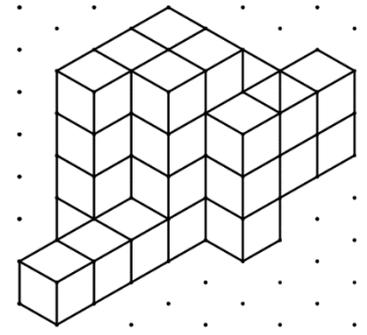
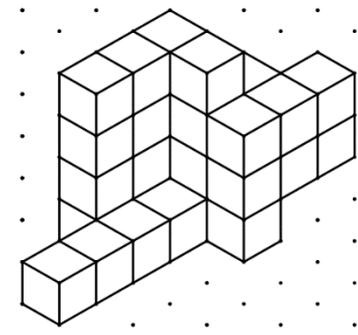
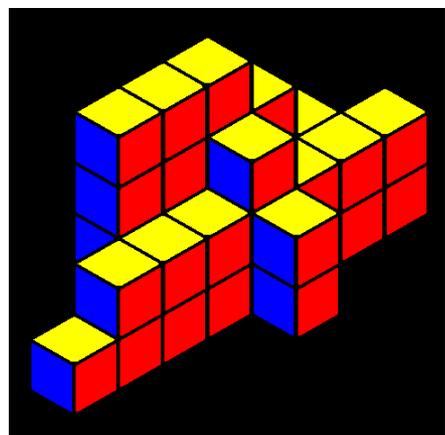
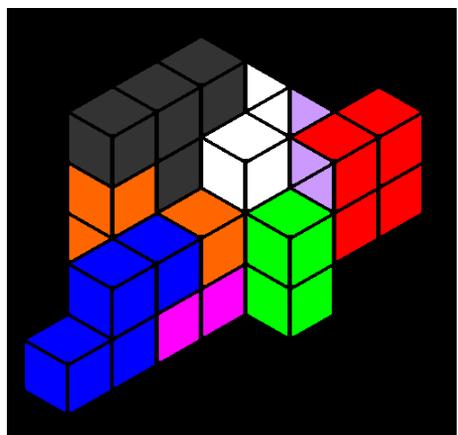
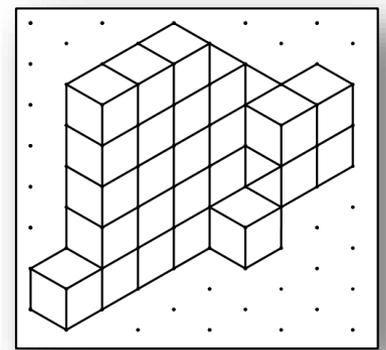
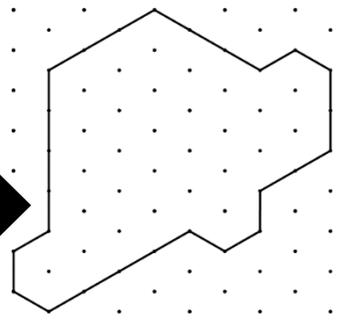
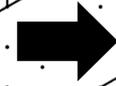
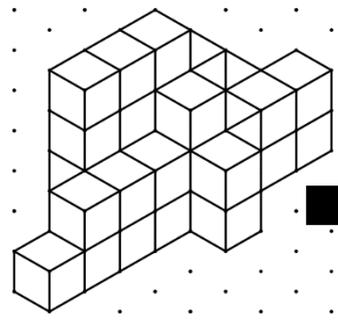
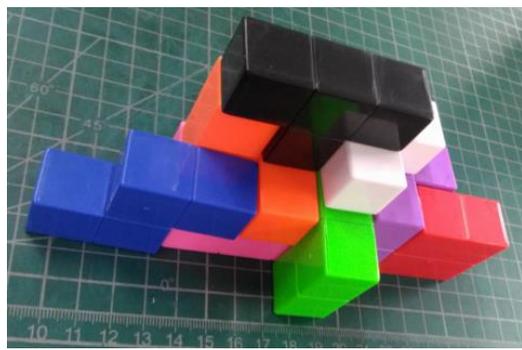


益智玩具轉化為教學活動



九色魔方

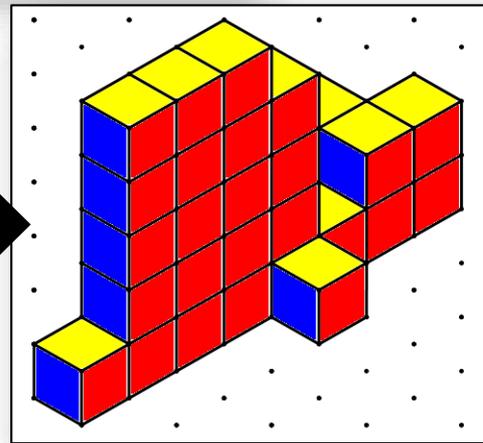
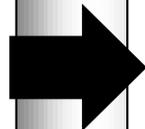
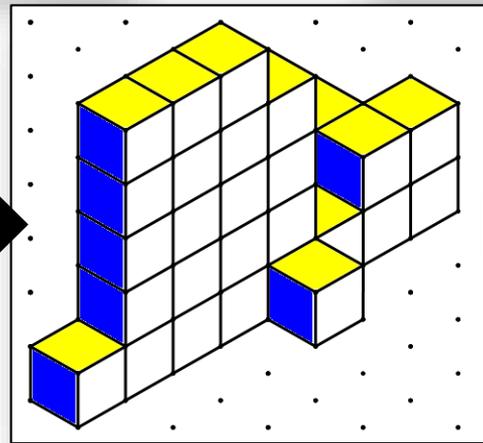
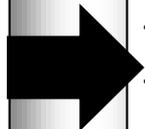
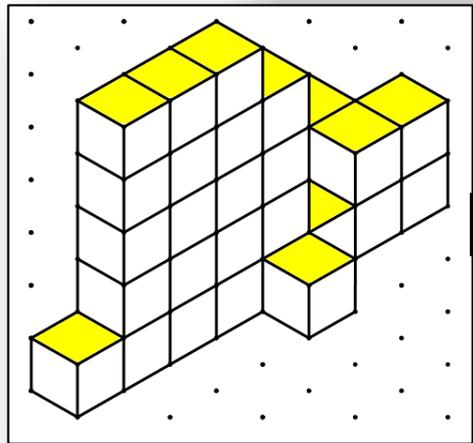
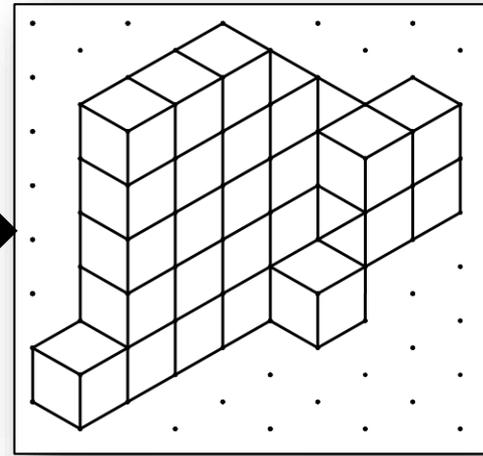
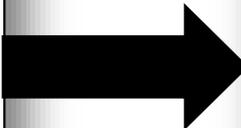
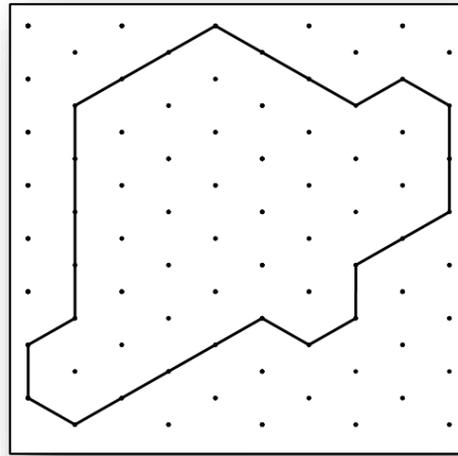
◆ 排一排 → 畫輪廓 → 畫視圖 → 上色



益智玩具轉化為教學活動



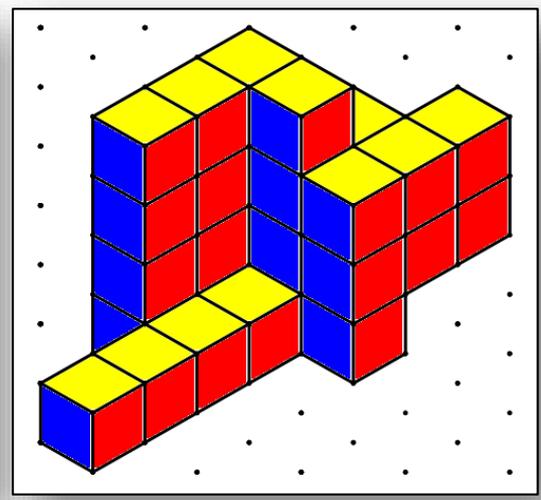
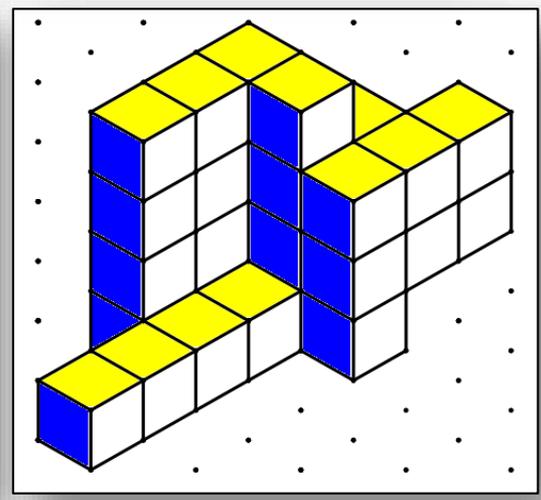
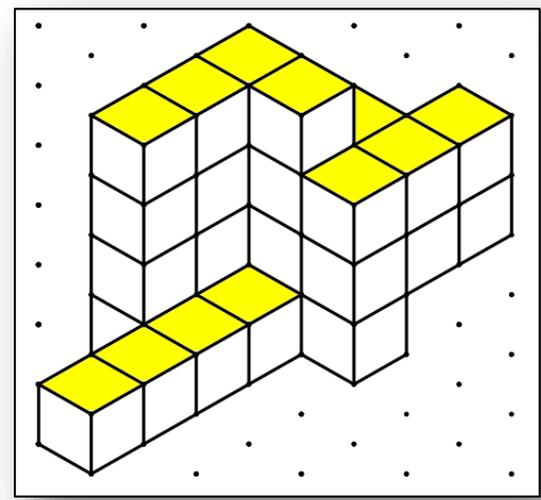
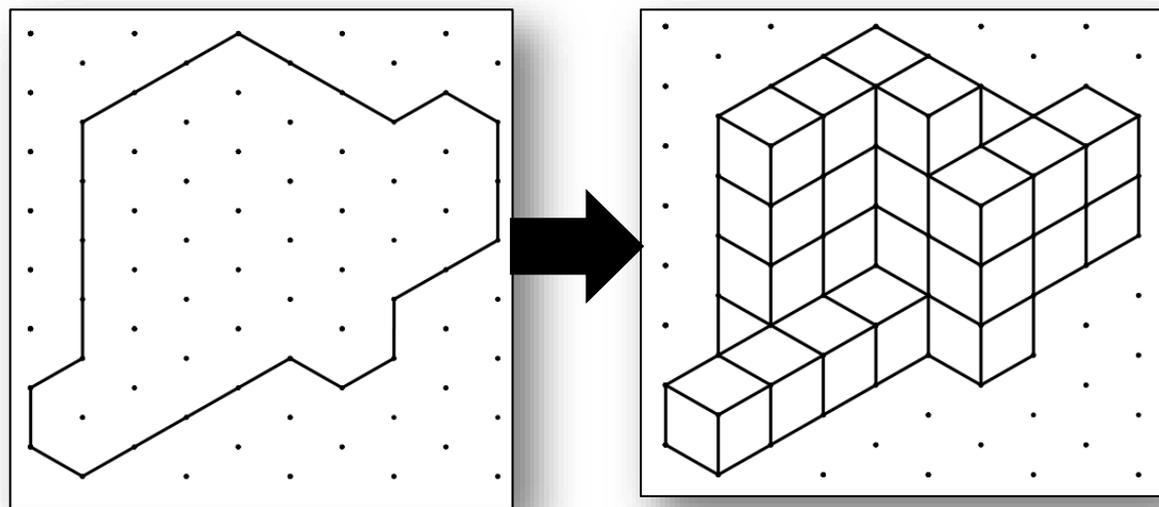
九色魔方 ◆ 排一排 → 畫輪廓 → 畫視圖 → 上色



益智玩具轉化為教學活動



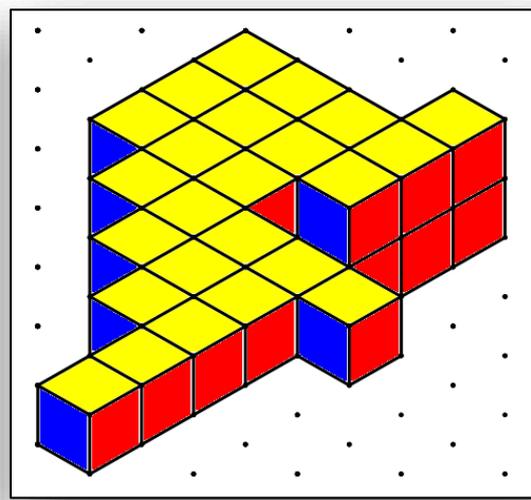
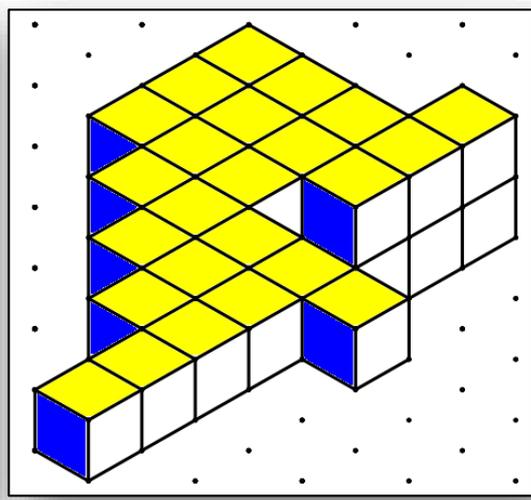
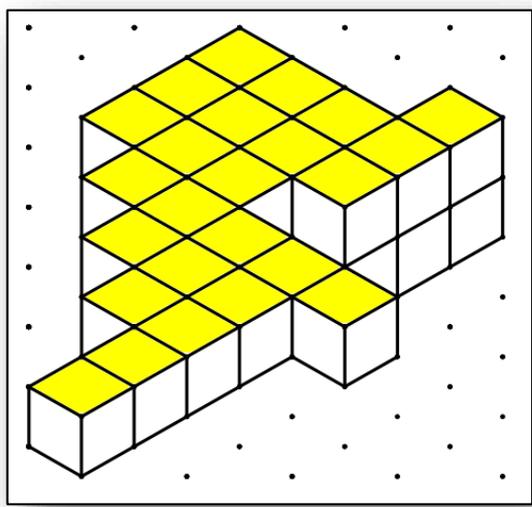
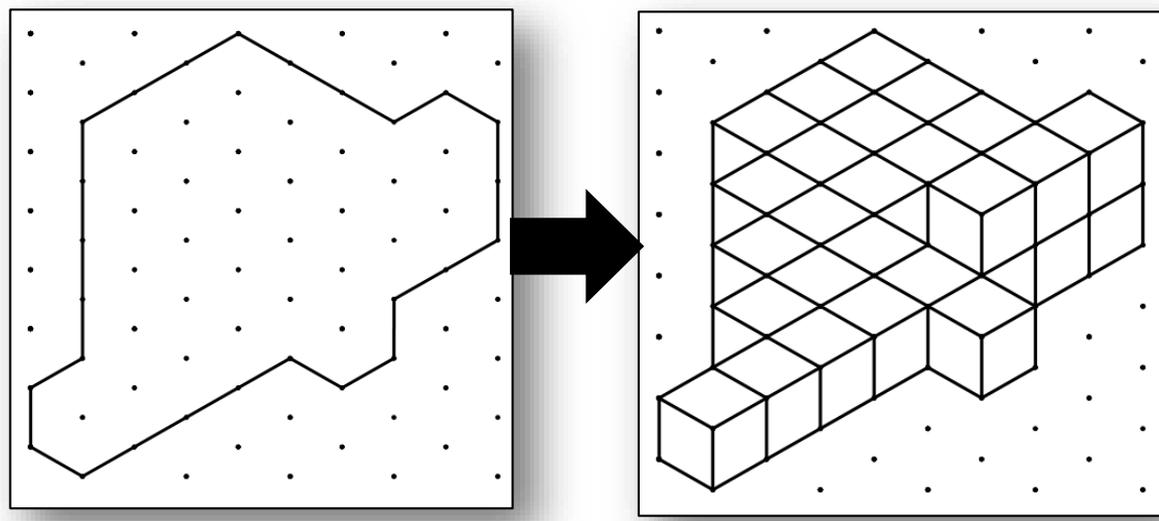
九色魔方



益智玩具轉化為教學活動



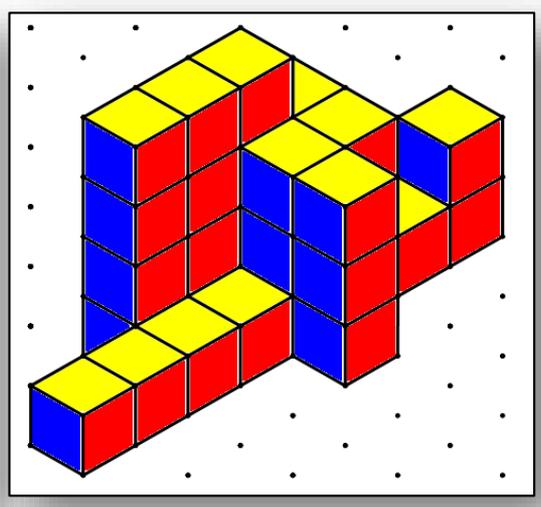
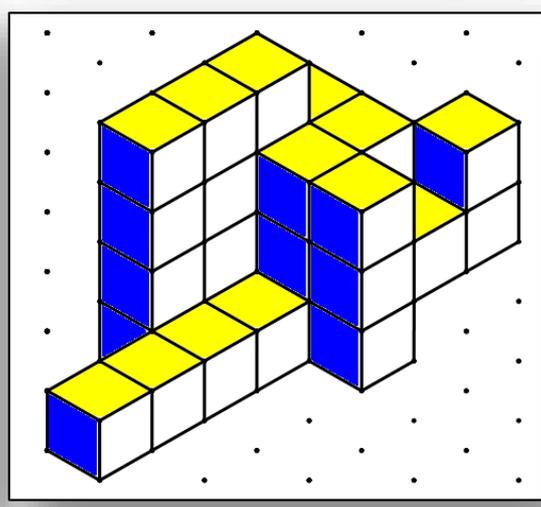
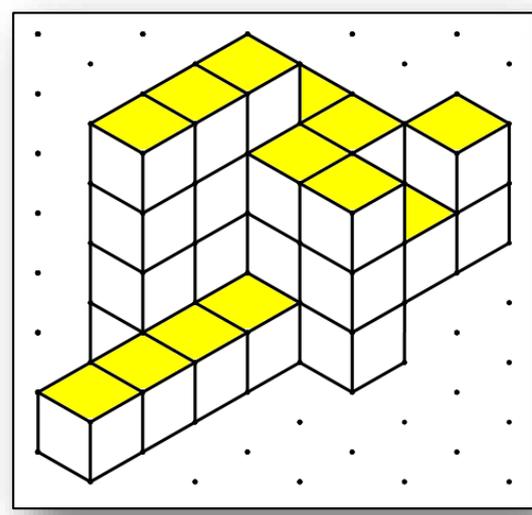
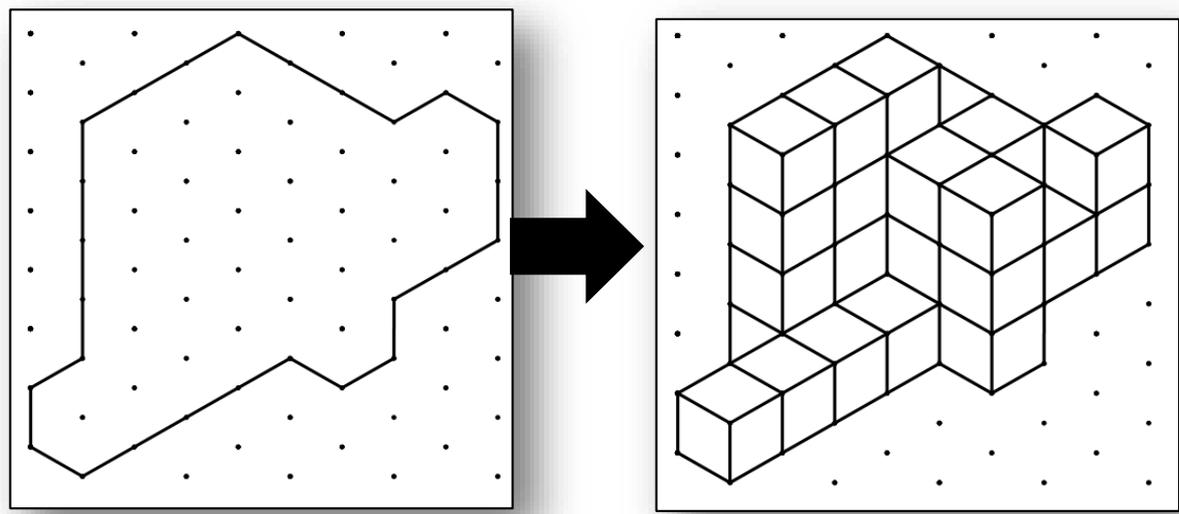
九色魔方



益智玩具轉化為教學活動



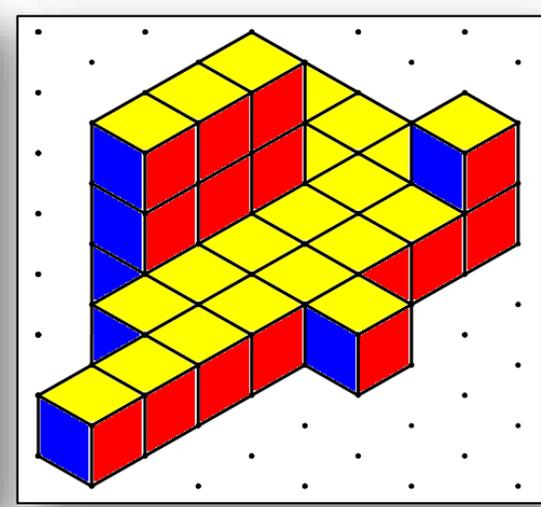
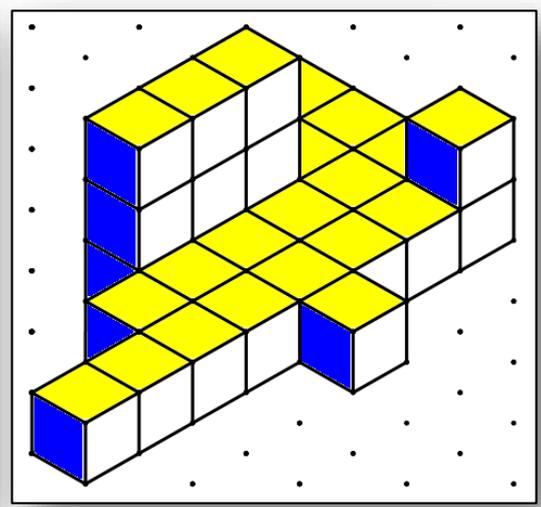
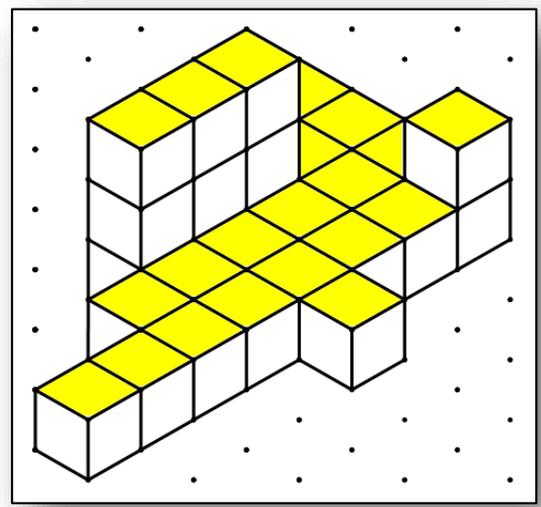
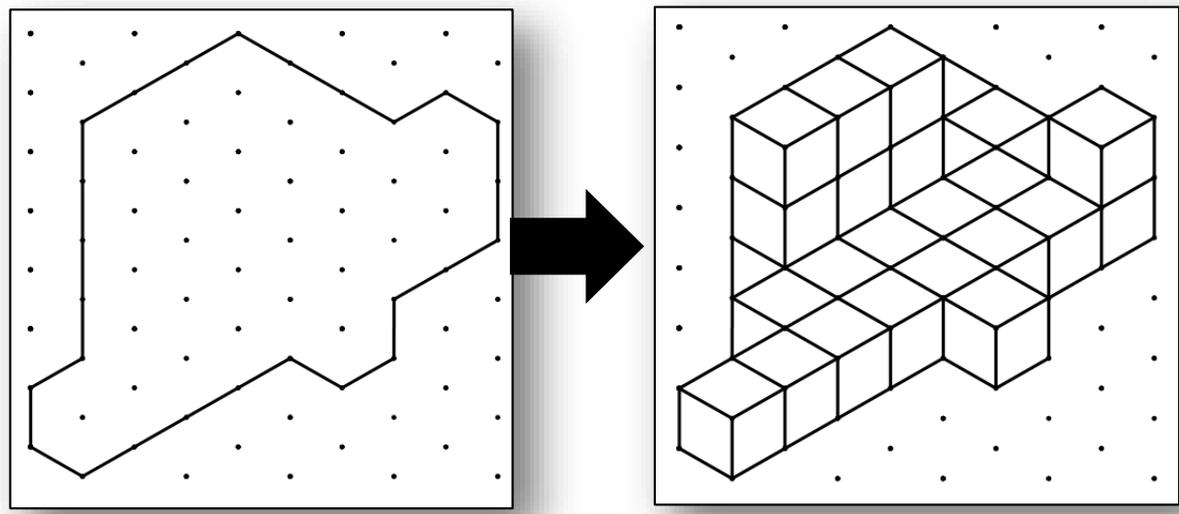
九色魔方



益智玩具轉化為教學活動



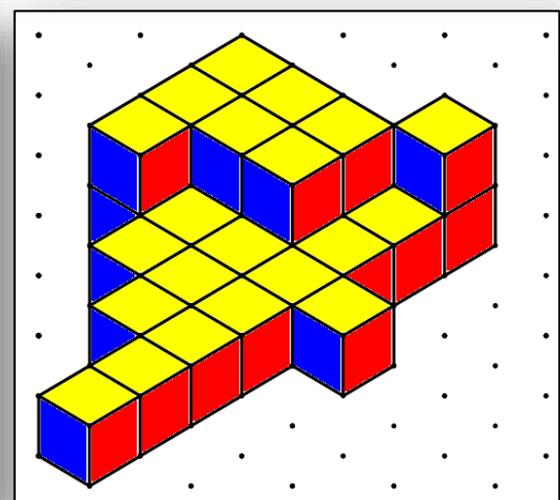
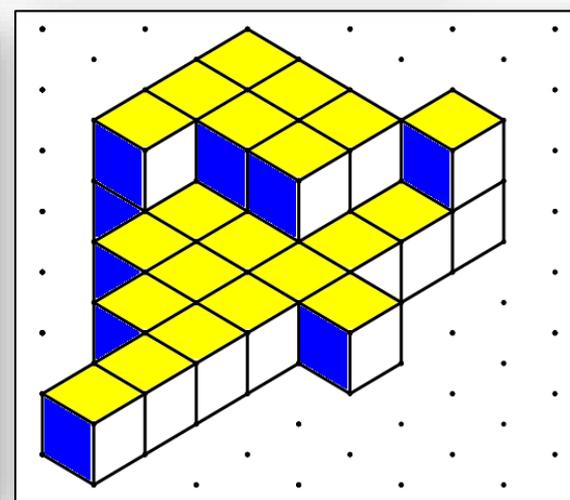
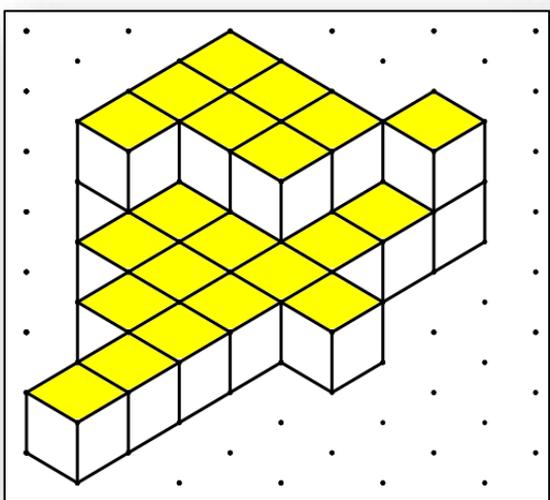
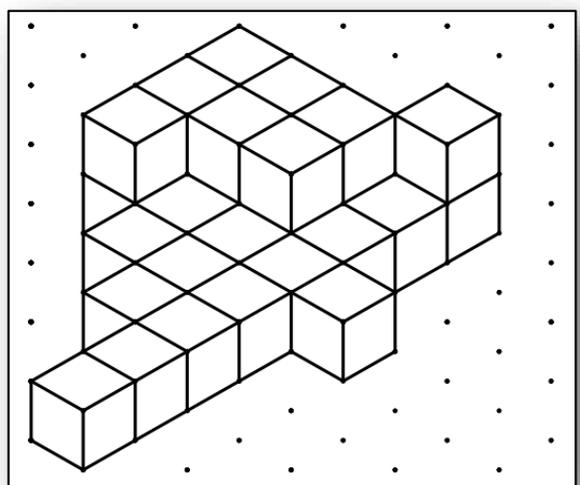
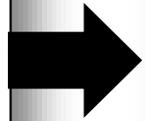
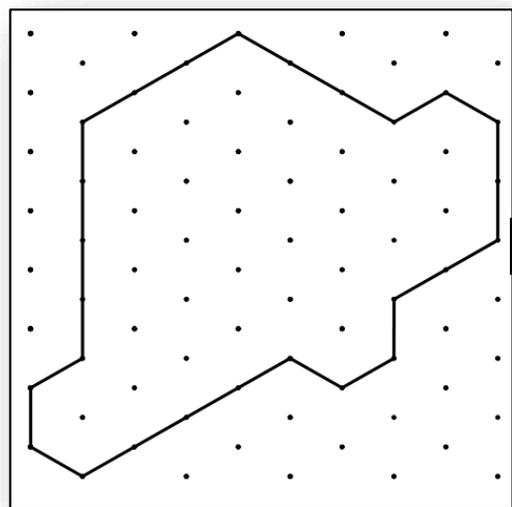
九色魔方



益智玩具轉化為教學活動



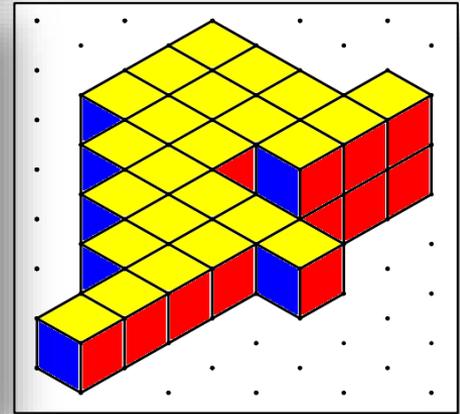
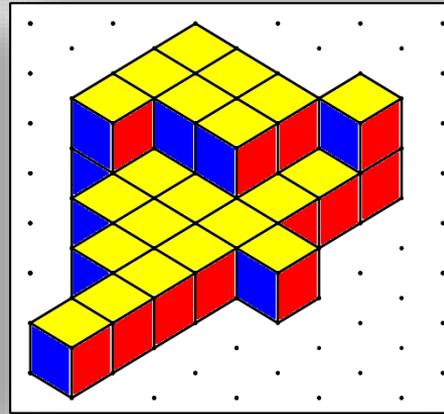
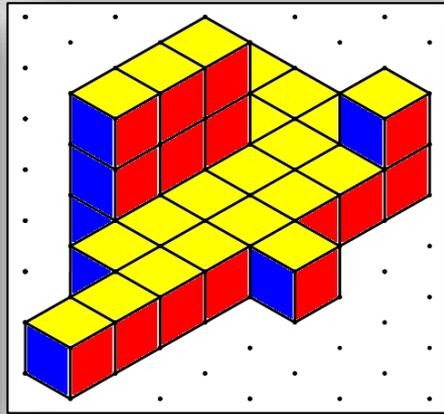
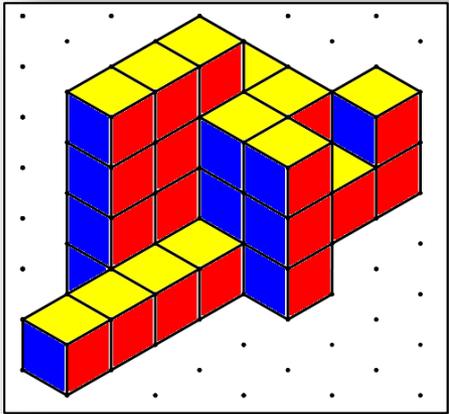
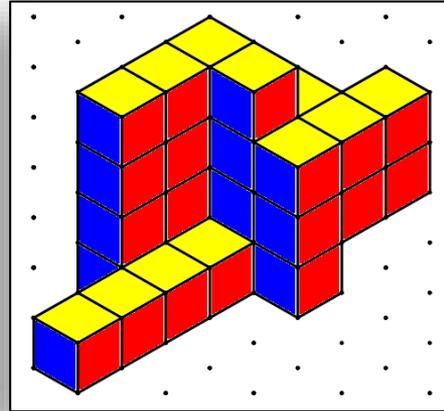
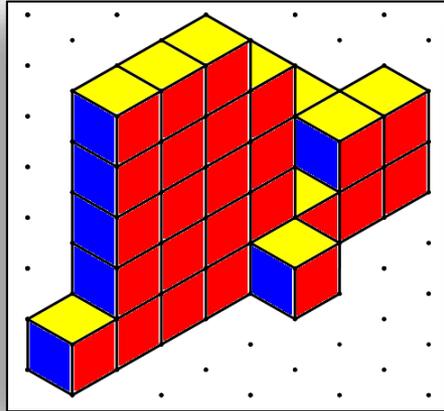
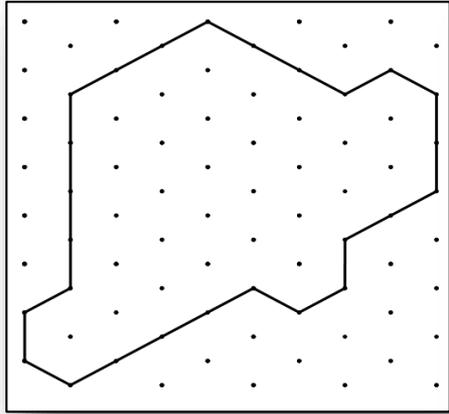
九色魔方



益智玩具轉化為教學活動



九色魔方



【結語】

德國學者：

把15克的鹽放在你面前，你無法嚥下，但若將鹽放入美味的湯裡，你一下子就吸收了，這代表什麼呢？

知識要融入情境，且教師若能營造出學童對知識的需求感，那麼將會更有助於學習。

知識之於情境，就好比鹽之於湯

