Welcome to Math Mondays

MATH Mondays!

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Getting Started

- Your microphone will be muted.
- Should you experience difficulty with your connection during the session, use the Chat feature, and the session moderator will assist you.
- Should you have a question for the lead during the session, please use the Chat feature to notify the moderator.

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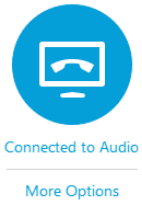
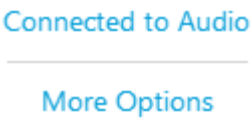
Audio Connection

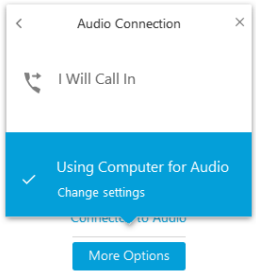
- To connect to audio:

  click 

  ‘Connect to Audio’

- If you are unable to connect through your computer:

  click **‘More Options’** 

  then, click ‘**I will call in’** 

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OECTA Prayer

Creator God, we praise you, the source of all life. Renew our faith and guide us in our ministry as Catholic teachers. Let us touch the hearts and minds of those with whom we work.

Lord Jesus, share with us your counsel, so we may choose knowledge over ignorance, wisdom over waste, peace over injustice,
community over isolation and service over domination.

Holy Spirit, nurture our growth. Inspire us to give birth to the creative powers within us. Let us come to the fullness of life promised in the Gospel.

Amen

Welcome

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Hip to Be Square

Cathy Chaput
April 9, 2018

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Overview

Spatial Thinking: What? Why? Why Now?

Visualization Activities

Activities Using Colour Tiles

Activities Using Tangrams

Activities Using Linking Cubes

Questions

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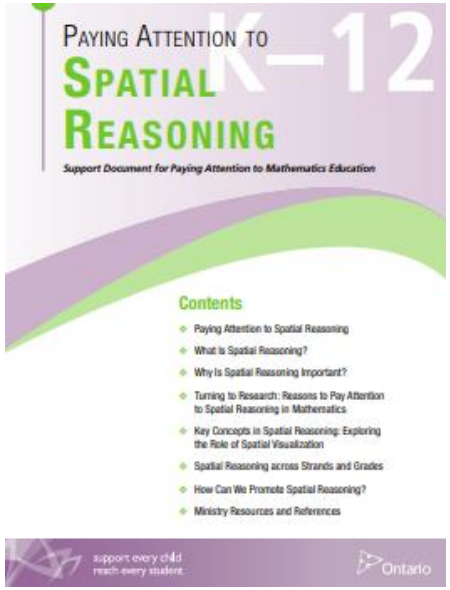
Spatial Thinking: What?

Spatial Thinking involves three components:

- Concepts of space
- Tools of representation
- Processes of reasoning

National Research Council 2006



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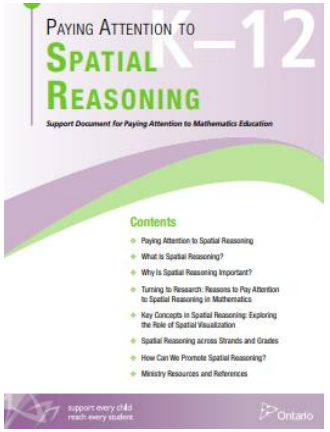
Spatial Thinking: What?

"…involves understanding relationships within and between spatial structures and, through a wide range of possible representations…involves the means to communicate about them."

National Research Council 2006



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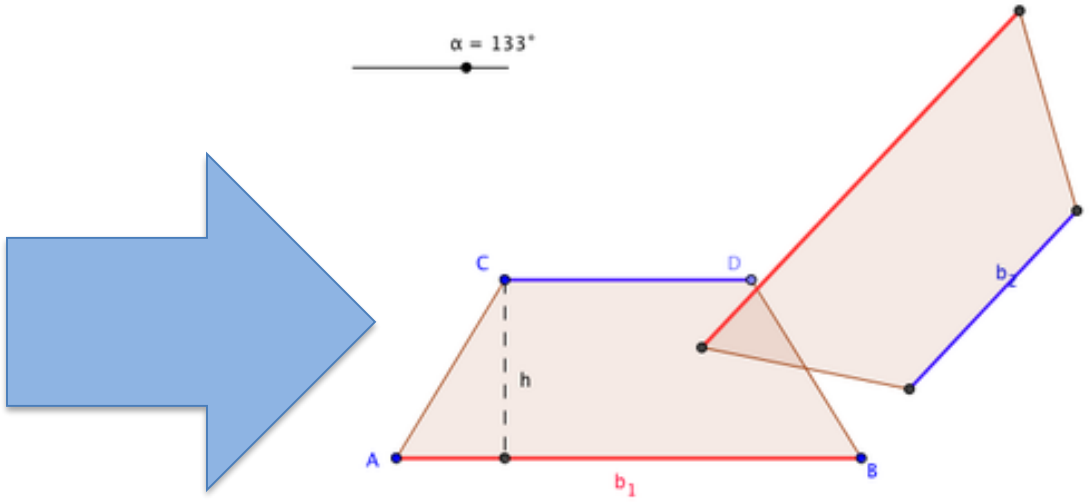
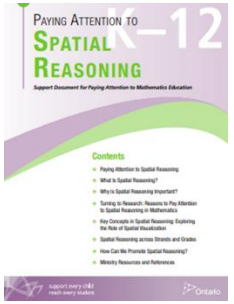
Spatial Thinking: What?

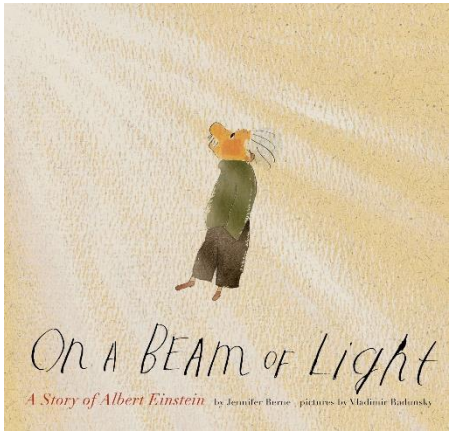


Spatial Thinking: Why?

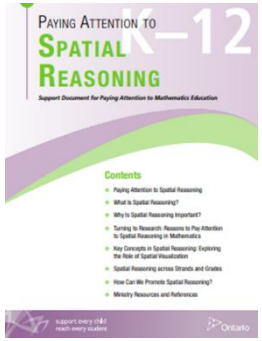


- Allows math to become more visual,

which connects more to what true mathematicians do whey they are making discoveries.



Spatial Thinking: Why?



1. Spatial thinking is critical to math thinking and achievement.
2. **Spatial thinking is malleable and can be improved through education and experience**.
3. Schools play an important role in fostering spatial reasoning.

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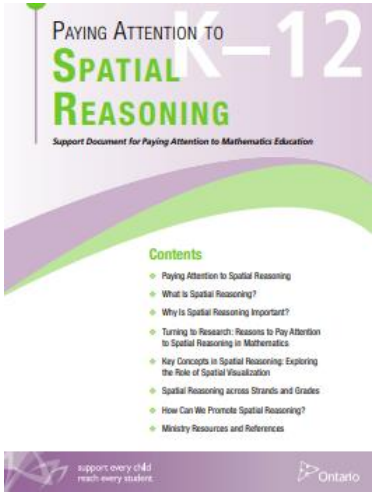
Spatial Thinking: Why Now?

- Socioeconomic Issues
- Gender inequalities
- Mathematics learning difficulties



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What Is Spatial Visualization?

- using our mind to create and transform an image.
- “seeing with the mind’s eye”

The ‘Three V’s’ are a good practice to use to support visualization:

Visualize **V**erbalize **V**erify

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Spatial Visualization Activities

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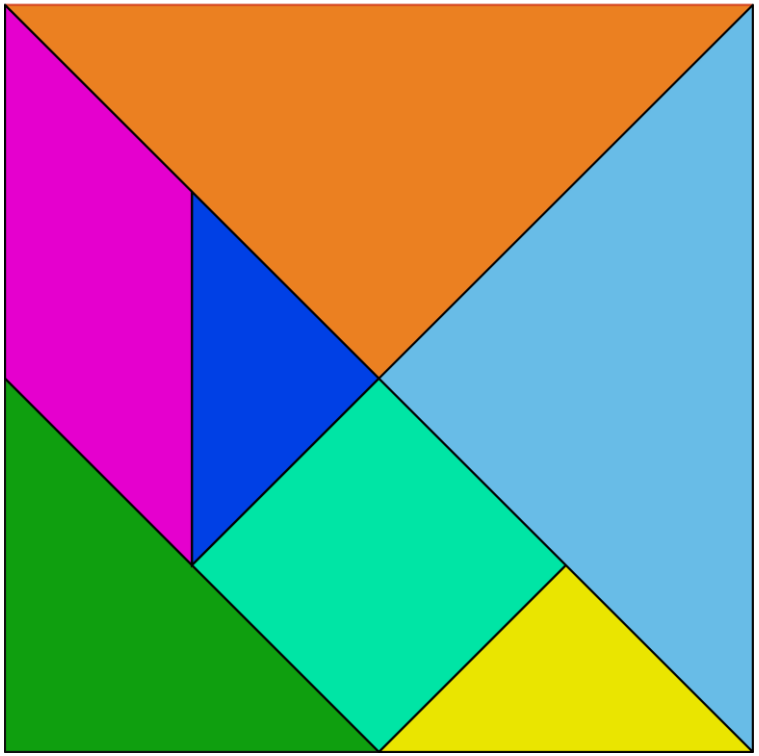
Composition and Decomposition



Composition and Decomposition

Use your tangrams to work on the following:

- Make a square using two tangram pieces
- Make a square using three tangram pieces
- Make a square using five tangram pieces
- Use all seven tangram pieces to make a rectangle that is not a square

Tangrams

Integrating Other Strands

Reference:
http://www.edugains.ca/resourcesMath/CE/LessonsSupports/Manipulatives/Manipulatives_Tangrams.pdf

Assume that each tangram has a value of one whole. Find the value of each piece stated as a decimal (or percent).

If the largest triangle represents 5/8, then what fraction does the smallest triangle represent?

Integrating Other Strands

Use the smallest triangle and the largest triangle to explore what happens to the area of a triangle when both the height and base are doubled.

Let *a* represent the area of the smallest triangle. What algebraic expression would represent the area of each other piece.

Create a tangram using 2 or more pieces. Then create an algebraic expression to represent the area of the design.

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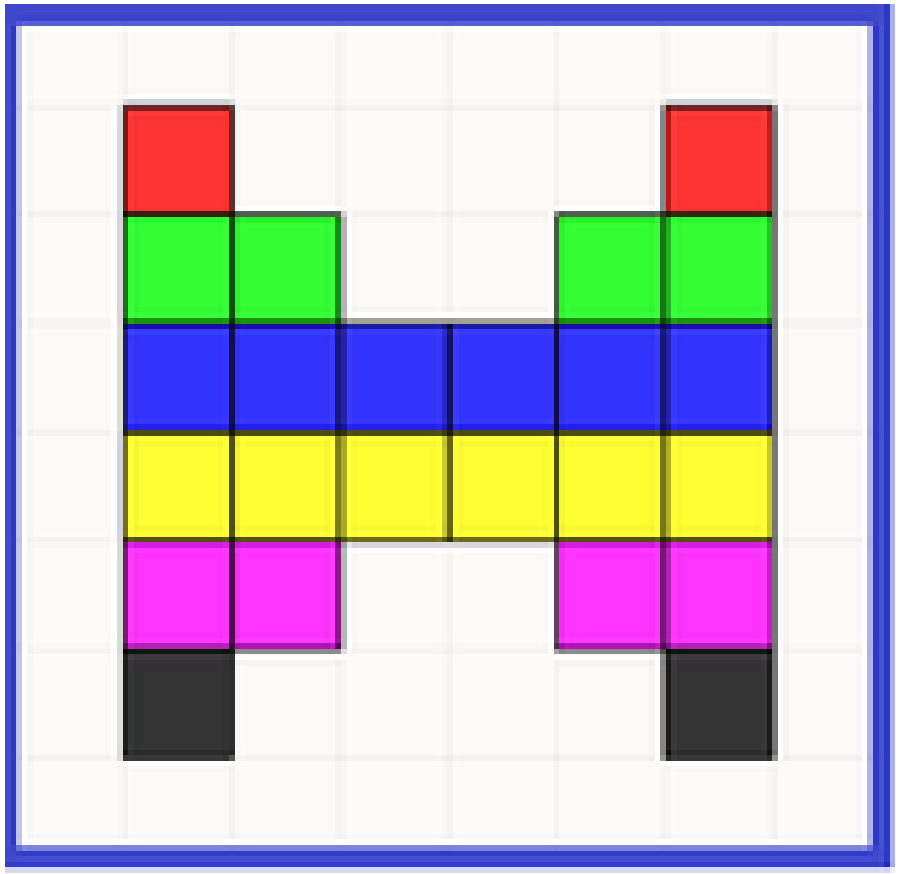
Integrating Other Strands

Secretly create a shape using tangram pieces. Do not let your partner see your shape. Give your partner instructions to build the same shape without your partner looking at your shape. Use the language of transformations to help them to follow your instructions (reflection, rotation, translation…).

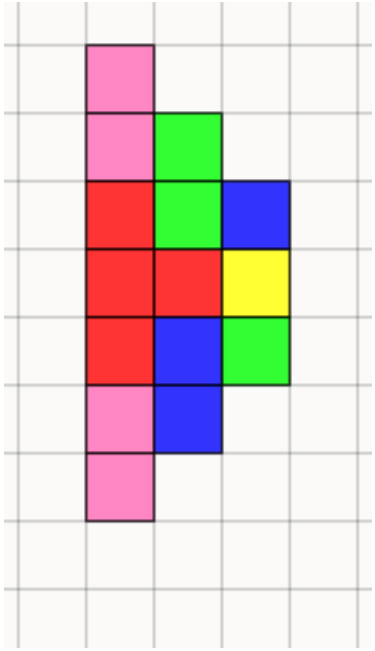
Integrating Other Strands

Create a spinner using the names of the tangram pieces that meet at one vertex. Determine the probability that the spinner will land on each piece.

Symmetry



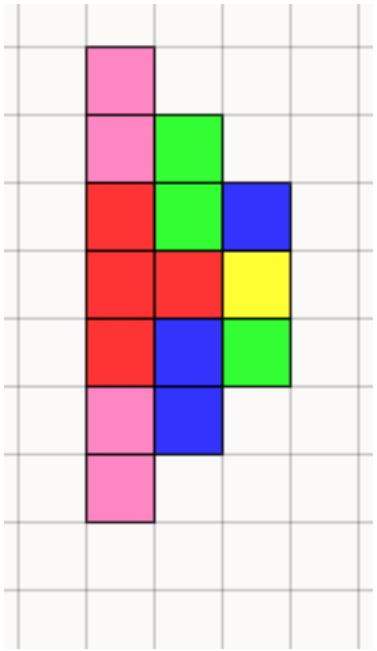
My Design

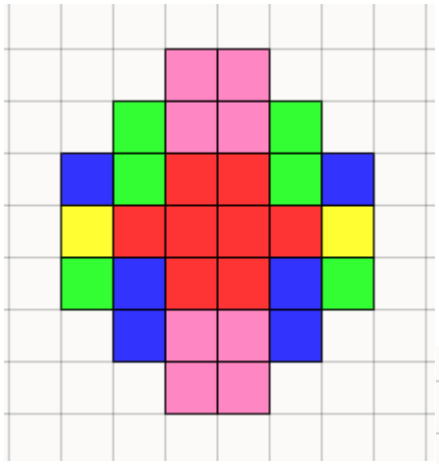


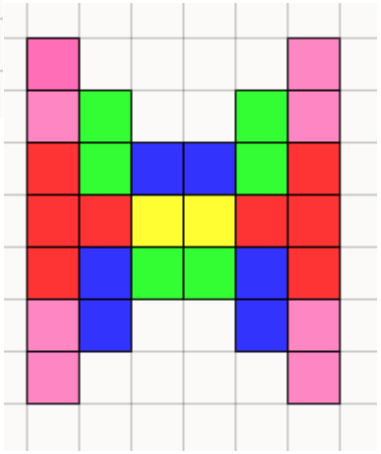
www.mathies.ca

Learning Tools – Colour Tiles

My Design







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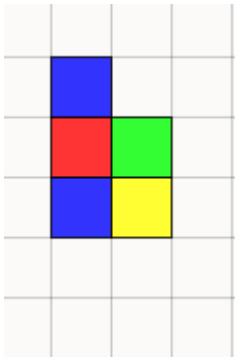
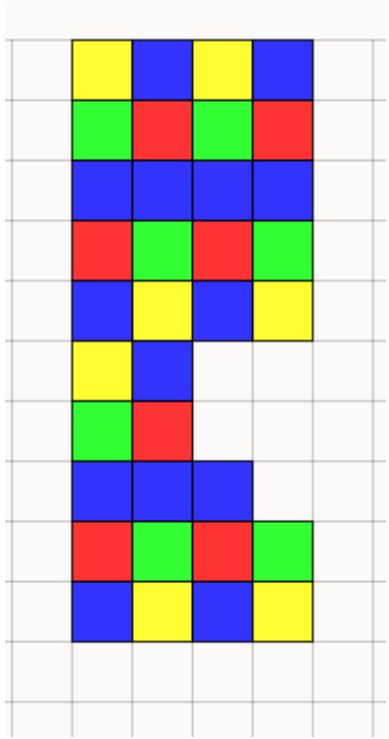
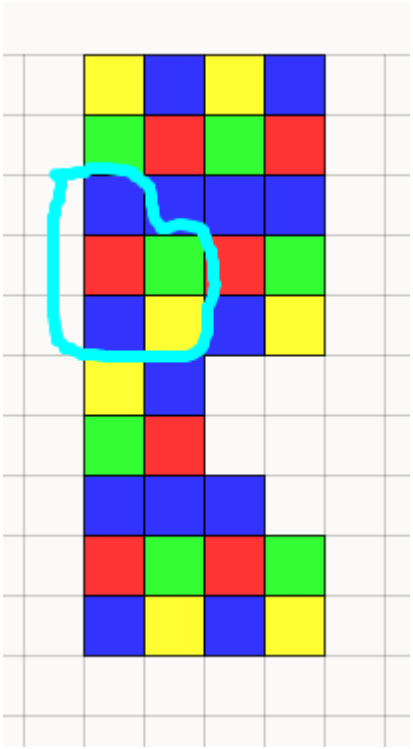
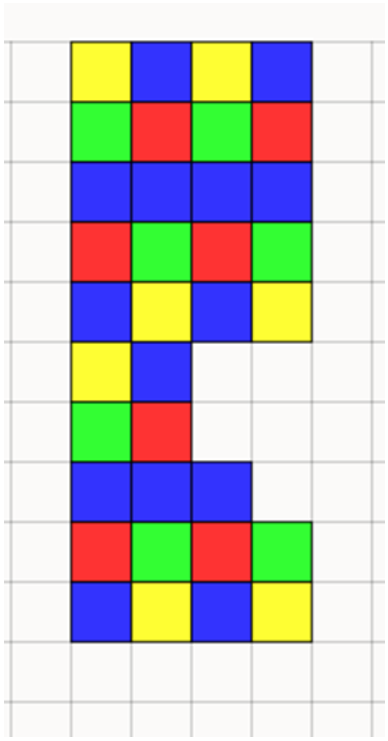
Tesselations

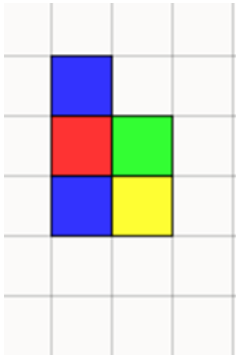


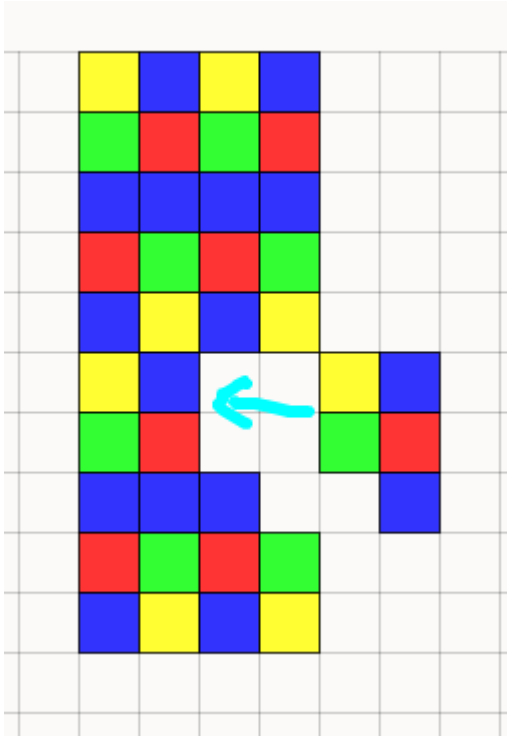




Tesselations







Helping Students Use Visualization

Building with the Mind's Eye

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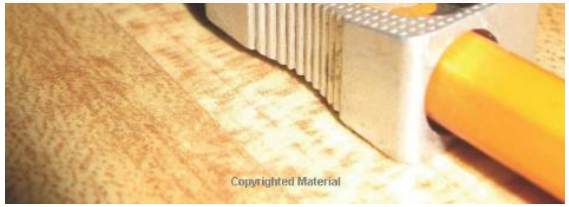
ROUTLEDGE

SPATIAL REASONING IN THE EARLY YEARS

3.
Building with the Mind's Eye

- Children were given oral instructions in how to build a 2D or 3D shape (e.g., "Take two blue cubes and attach them together, one on top of the other. Stand up the two attached cubes and make them look like a tower. Now take a red cube and attach it to ....")
- Children built images of the shape in mind, based on instructions given
- After giving instructions, teacher showed children multiple shapes and had children discuss/reason which one perfectly matched the description

- Visualization
- Composition of 2D shapes, 3D shapes
- Mental transformations
- Spatial language comprehension
- Visual-spatial working memory



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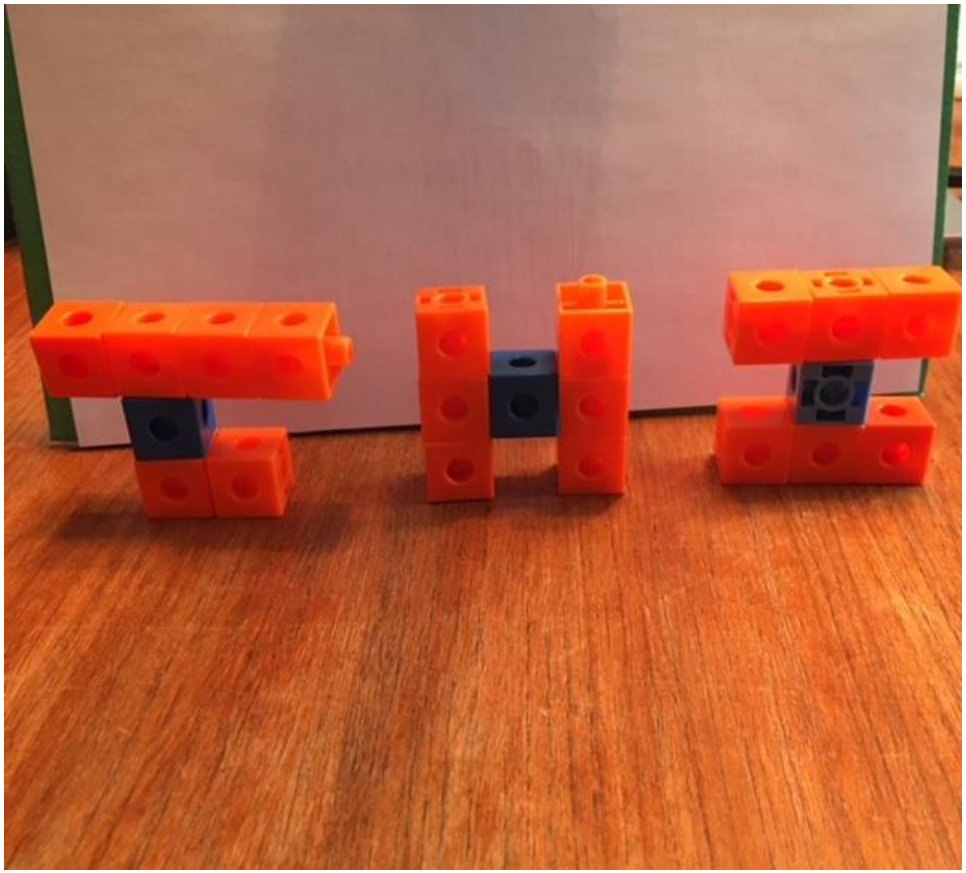
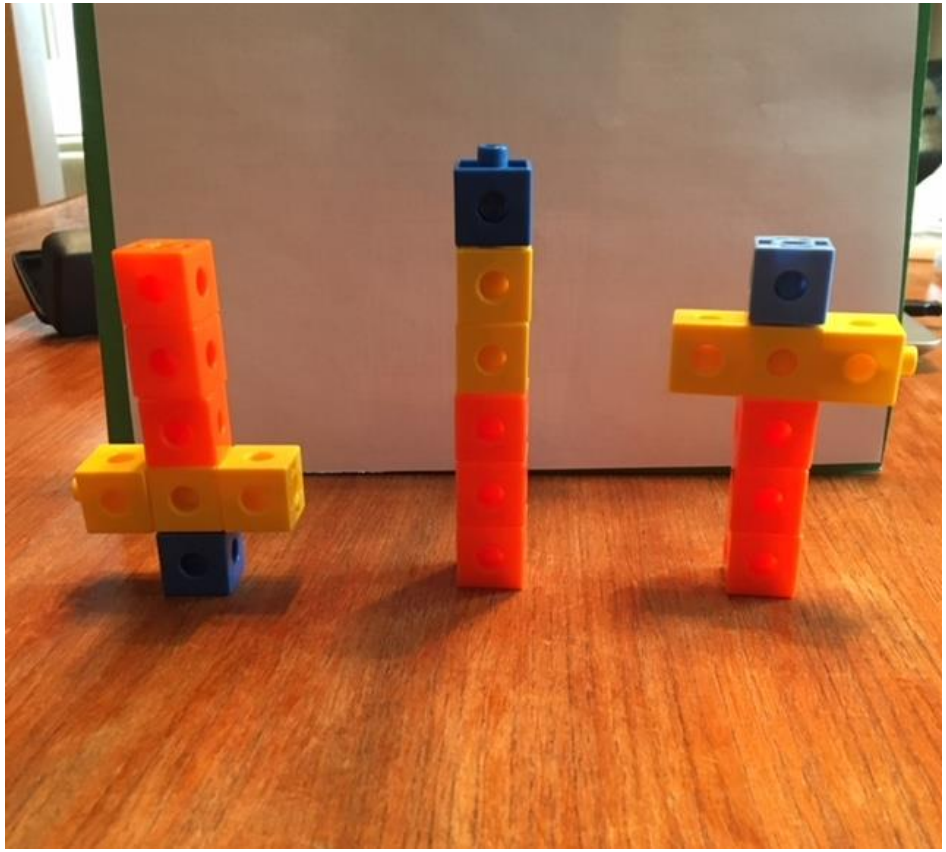
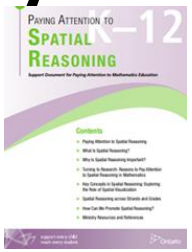
Building with the Mind's Eye



Building with the Mind's Eye



Thinking With the Mind's Eye



Imagine a large cube floating in front of you. The cube is made up of 64 smaller cubes and thus is a 4 × 4 × 4 cube. Now, imagine that you are staring directly at the front of the cube so that all you can see is the front face of the cube – a 4 × 4 square face. You are now going to drill a hole through the four corner cubes that are facing you, all the way through to the back face.

Now, imagine looking down on the cube from above – a bird's-eye view. Again, your view is such that all you see is a 4 × 4 square. You drill a hole through the four corner cubes all the way through to the other side.

How many of the 64 cubes do not have holes drilled through them?

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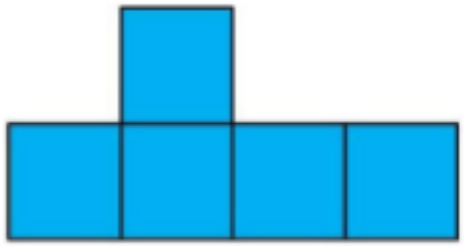
Colour Tile Challenge

Take five colour tiles. It doesn't matter if they are different colours or all the same colour.

Arrange the five tiles in as many different ways as you can.

The only rule is that sides have to line up and vertices have to line up.



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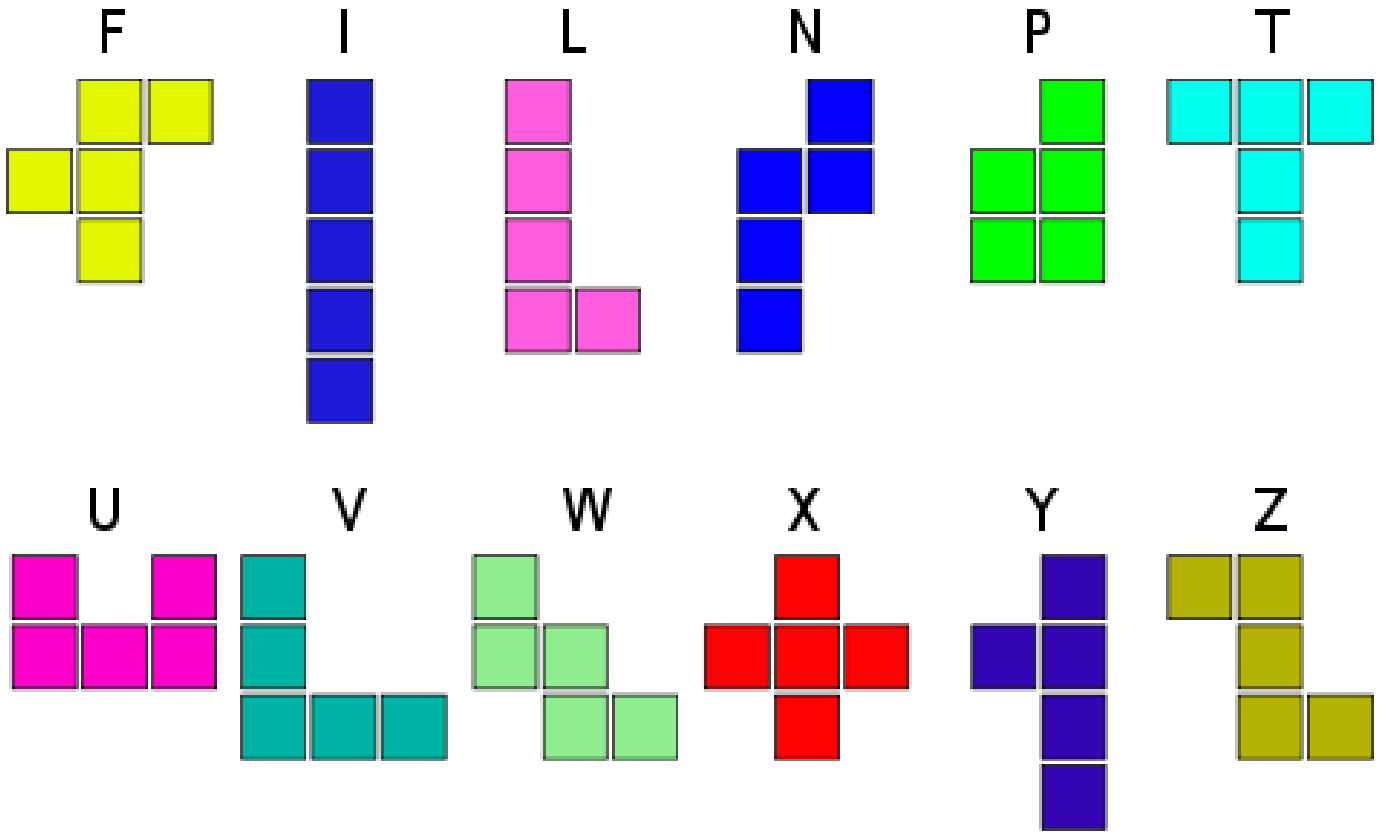
Pentominoes



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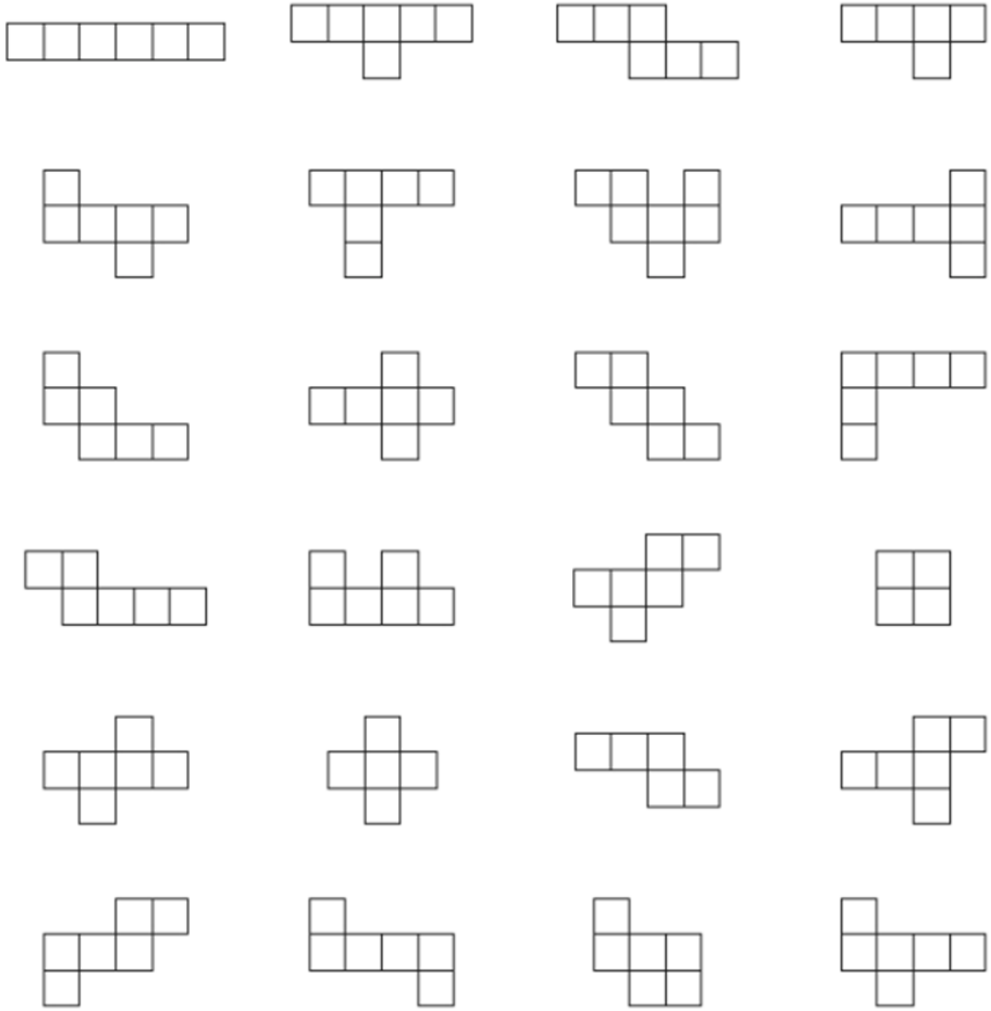

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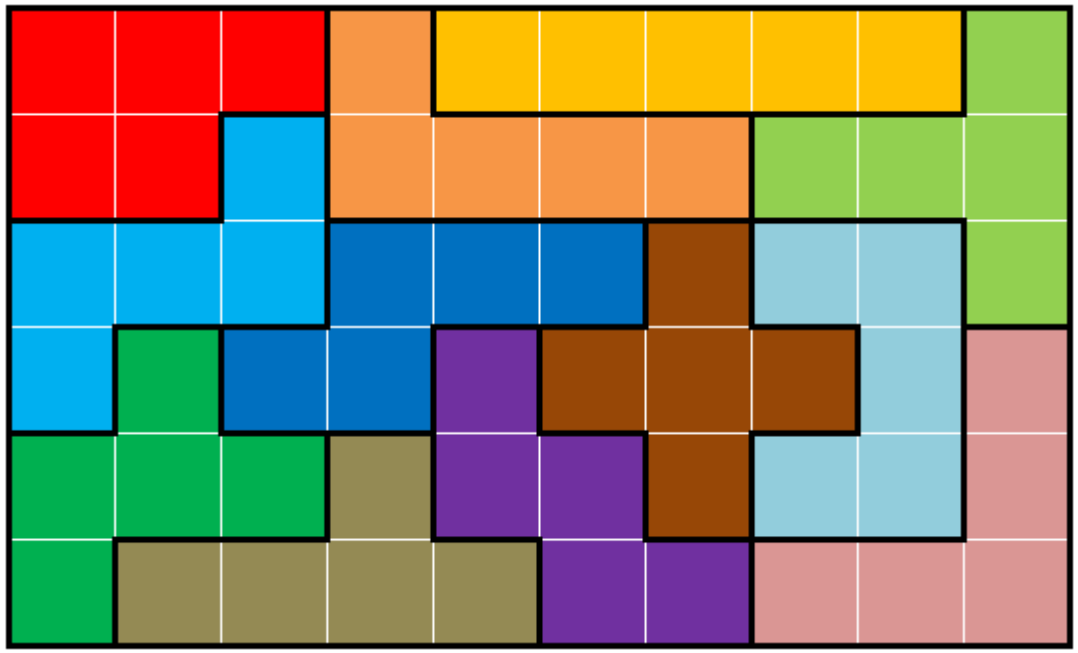
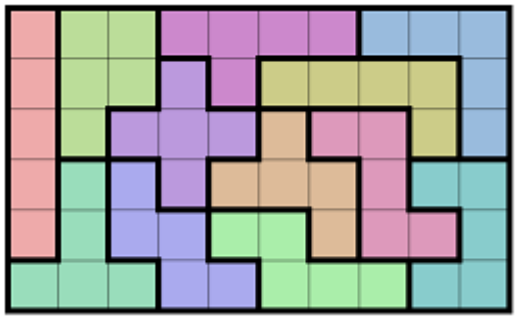
Pentominoes





6 × 10

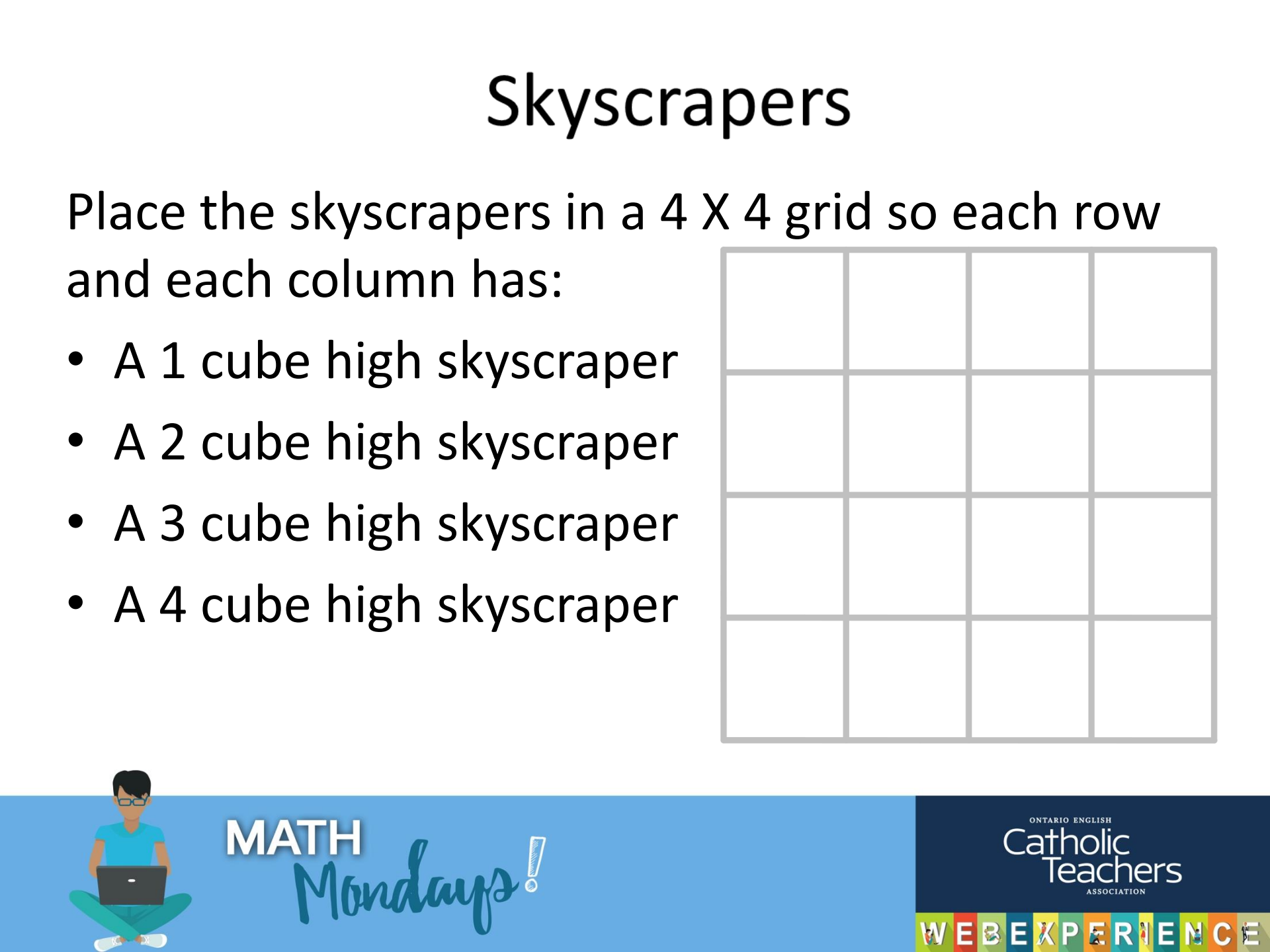
Skyscrapers

Make 4 towers that are 1 cube high, 4 towers that are 2 cubes high, 4 towers that are 3 cubes high, and 4 towers that are 4 cubes high.

Skyscrapers

Place the skyscrapers in a 4 X 4 grid so each row and each column has:

- A 1 cube high skyscraper
- A 2 cube high skyscraper
- A 3 cube high skyscraper
- A 4 cube high skyscraper



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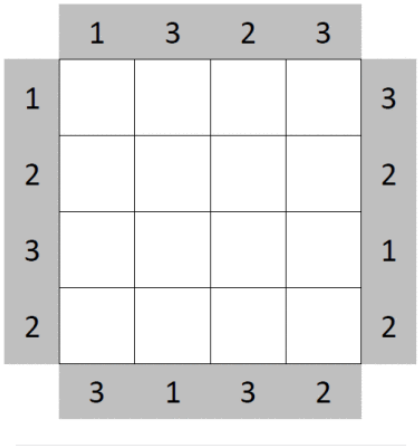
Skyscraper Puzzles

https://buildingmathematicians.wordpress.com/2017/03/14/skyscraper-templates/



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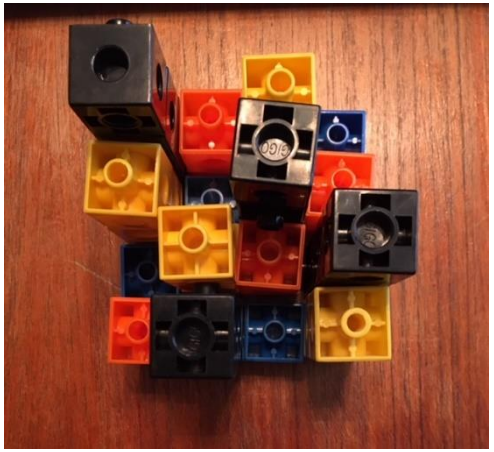
	1	3	2	3	
1					3
2					2
3					1
2					2
	3	1	3	2	



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WebExperience: Math Mondays Feedback

https://www.surveymonkey.com/r/weMathMondays

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kindergarten

mathematics

- Math, Teacher Well-Being, Technology, Kindergarten
- Live weeknights
- Bite-sized and interactive
- Recorded and archived

technology

well-being

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