Mathematical investigation (2)

Investigating is a great way to learn to think mathematically, apply logic, spot patterns and improve our perseverance.

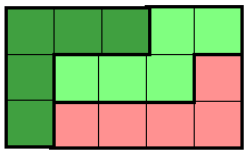
Pentomino Puzzles

AIMS: *Use pentomino pieces to solve puzzles.*

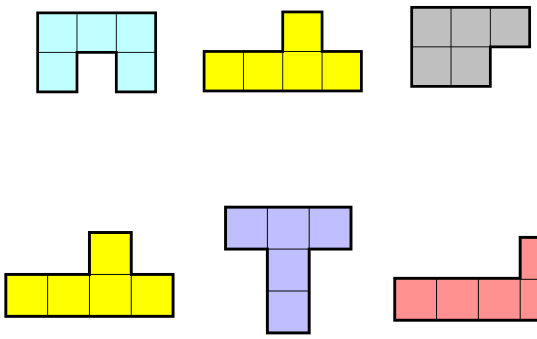
You will need:

Set of 12 pentominoes – Use the set you cut out previously, or cut out a new set. Or, you can use an online version of the pentominoes to try these puzzles, e.g. https://mathsbot.com/manipulatives/pentominoes

- **Pentominoes** can be joined together to make a rectangle.
- The smallest possible rectangle is **3 by 5** made with **3 pentomino pieces**. Try this out with your pentominoes.



- Now try the same thing with these sets of **3 pieces**

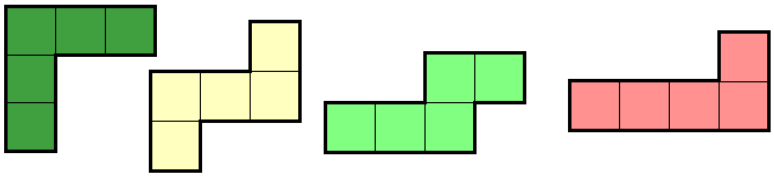


Can you find any other sets of 3 pentominoes that make a rectangle?

Remember to try rotating or reflecting the pentominoes.

Larger rectangles

- Try creating a **4 by 5 rectangle** with these 4 pieces:



- Now create a 4 by 5 rectangle using different pieces.

- Try to make large rectangles with different numbers of pieces. The total number of squares in the rectangle will always be a multiple of 5. Why is that?

- If you are stuck, have a look at the next page where there are solutions for **5 by 5, 6 by 5 and 8 by 5 rectangles**.
  There is also a solution for a **12 by 5** rectangle which uses all 12 pentominoes!

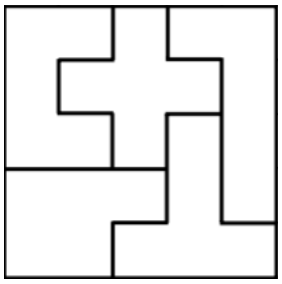
- There are **many** possible solutions for each of the rectangles, so keep trying to find some more. Remember ***perseverance*** is important in solving problems, so don't give up!

  You could take a picture or make a drawing to record your solutions.

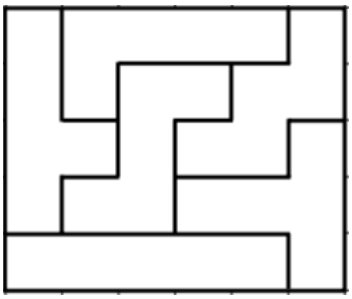
Some questions

- What are the 'best' pieces to use to solve these puzzles?
- Which pieces are trickier to work with?
- What strategies did you discover to help find your solutions?

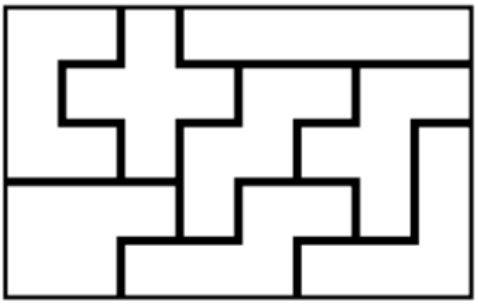
Solutions



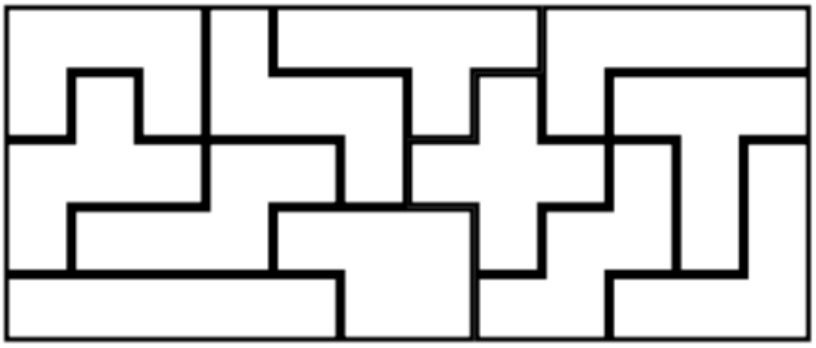
5 by 5



6 by 5



8 by 5



12 by 5