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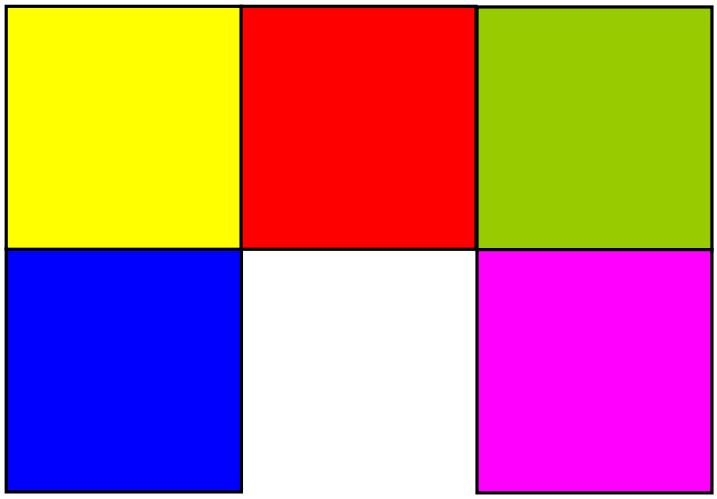
INVESTIGATION

Pentonimoes



MathSphere

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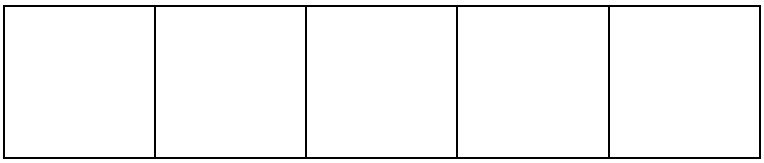
Investigate pentonimoes

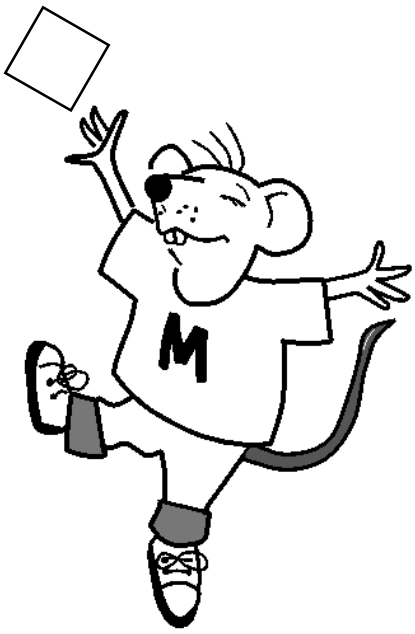
A pentonimo is a shape made up of 5 equal squares touching edge to edge.

This is a pentonimo:



How many different pentonimoes can you make?

Check your results.



Checklist:

Have you made a prediction?

Have you drawn a table of results?

How do you know when you have found them all?

Good luck!

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Answer guide 1

Numeracy Strategy references: *Reasoning about numbers and shapes* pages 78/79.

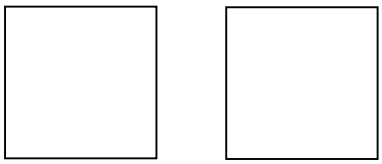
Particularly appropriate for year 5 but can easily lead to excellent year 6 work. It encourages logical thinking and working in a methodical way as well as checking answers.

A pentonimo is a 5 squared shape ie a shape made out of 5 equal squares. This investigation is straightforward but can lead into many avenues of exploration.

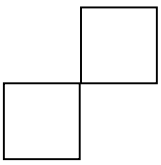
Starting Point

Whole class introduction:

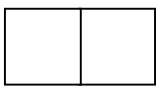
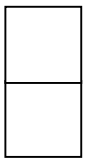
How many different shapes can you make by putting two squares together?



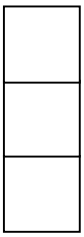
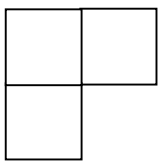
Discuss what is meant by a shape - for example it is better not to include:



Discuss what is meant by different - for example

 is not different from 

It is probably a good idea to show how the shape can be turned to exactly cover the second shape eg on the Overhead Projector. The term congruent can be used.

How many shapes can you make with 3 squares?  and 

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Answer guide 2

Starter task:

Look at all the possibilities for shapes using 4 squares.

Record results in a table or chart.

One centimetre squared paper may prove too small if children want to cut the shapes out - larger squared paper is available at the end of this investigation.

Investigate:

How many shapes can be made with 5 squares?

See separate pupil sheet.

Extension activities:

1. Predict and find the perimeter of each pentonimo.
2. Predict and find which pentonimoes make a net for an open box.
3. Predict and test which pentonimoes tessellate.
4. Predict and test the number of shapes made with 5 triangles or 5 hexagons.
5. Predict and test how many different shapes can be made with 5 cubes eg multilink.
6. Put 10 squares together. How many ways can the shape be cut into two pentonimoes?
7. Put two different pentonomoes together. How many different shapes can be made?

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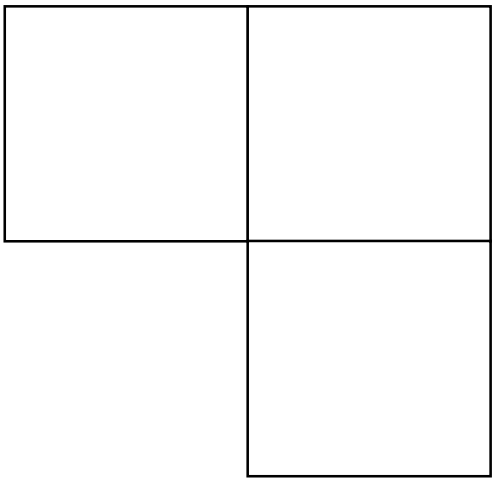
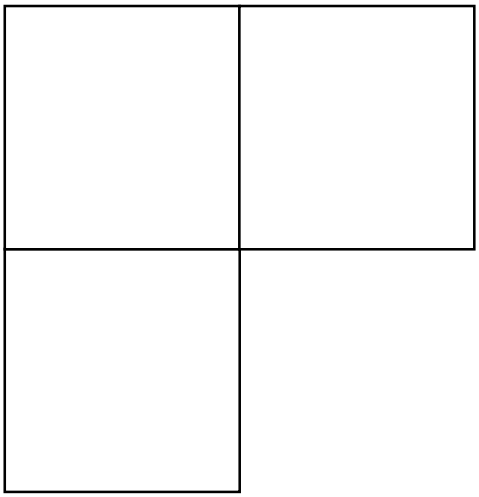
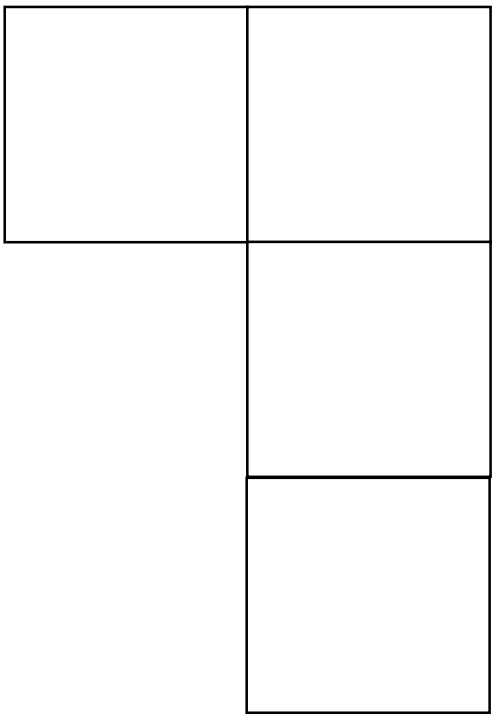
Answer guide 3

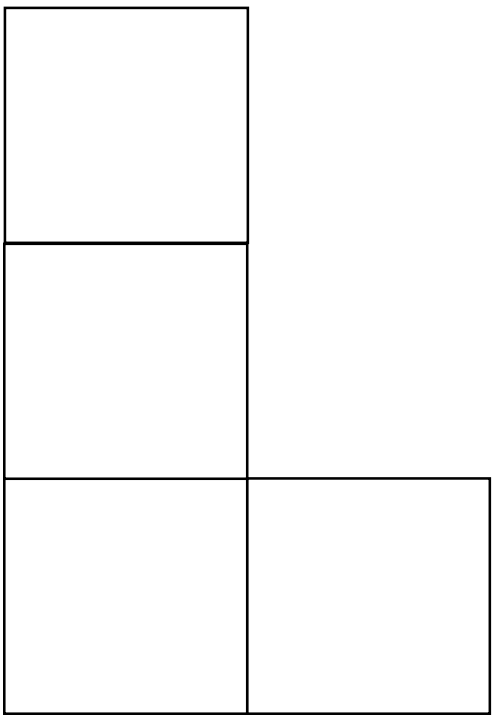
Some children have problems visualising shapes and seeing which are congruent.

Cut out the shapes below to illustrate that one shape is a reflection of another - they can be placed on the OHP or blu-tacked to the board.









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Answer guide 4

There are 12 possible pentonimoes as shown below: