

# Stick squares

24 wooden  
sticks

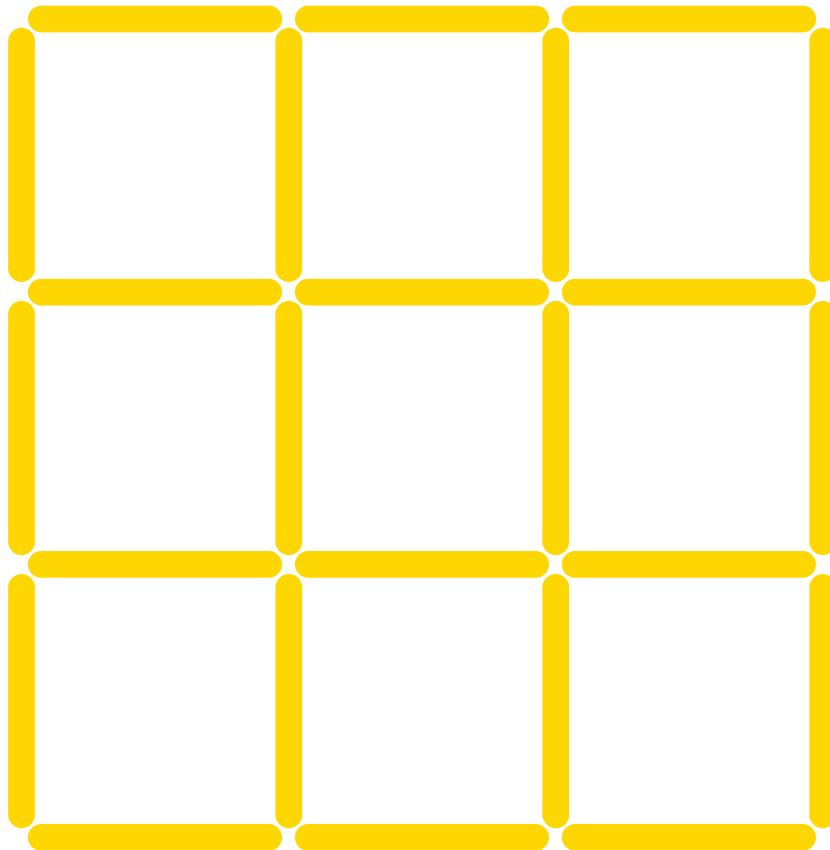
**16**

Years 5 and 6

How many squares altogether?

Reduce the total number of squares by 10  
by removing just three sticks.

You may leave rectangles, but there should be  
no odd sticks jutting out.



There are several ways of doing this.  
How many different ways can you find?

# Stick squares

24 wooden sticks  
Extension sheet from CD if required  
Recording sheet I for Extension

# 16

## Diagram problems and visual puzzles

Remove sticks to make fewer squares.

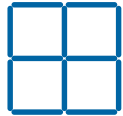
### Learning objectives

- M** Visualise 2D shapes and classify their properties
- P** Recognise and use patterns and relationships involving shapes
- P** Search for all possibilities

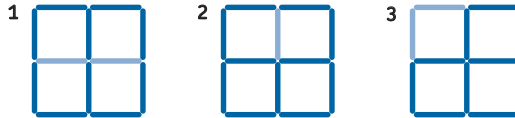
### Working on the problem

Getting started:

Draw this pattern of sticks on the board:



Children tell you how many squares they can see and so differentiate between the large square and the four smaller ones.



Remove one or two sticks in such a way as to leave only whole squares, not odd sticks jutting out (see squares 1-3).

Ask children how many squares are left. Before children tackle the problem on the card, explain that they can have rectangles, but should not leave odd sticks jutting out.

Support questions:

*Which stick could you try to remove first?*

*Are there other sticks which you must move now?*

### Problem-solving strategies

Children should try to be systematic in the way they remove sticks by visualising the squares that would be left. Rather than just removing three sticks at random, encourage children to keep track of the sticks they remove so they can work through the possibilities methodically.

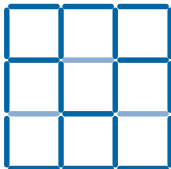
### Extension problems

You will find an extension on the CD.

### Problem solutions

There are 14 squares altogether (9 small ones, 4 medium ones and 1 big one).

Here is one solution:



Extension:

	Biggest square	Next size	Next size	Next size
1st square	1			
2nd square	1	4		
3rd square	1	4	9	
4th square	1	4	9	16

Each square produces a series of square numbers.

### Other related problems

14 Sticky triangles