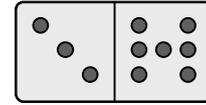
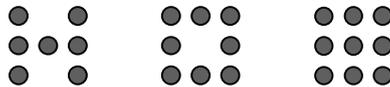
**intro**

This is a straightforward investigation which begins with a question : how many different dominoes are there in a set of 9-spot dominoes?

**first steps**

Pupils will be familiar with ordinary 6-spot dominoes. Begin by asking whether anyone knows how many different dominoes there are in a set like this . . . Usually one of the pupils will know that there are 28 (but if not, get out a set of dominoes and get someone to count them). Next, you can tell them that you can also buy 9-spot dominoes (and that there are various games you can play with them). Show them that the spots are arranged like this for the higher numbers :



Ask whether pupils think that a set of 9-spot dominoes would have more dominoes than an ordinary 6-spot set, or fewer . . . The answer is of course more dominoes – but how many more? Ask pupils to guess how many dominoes you would need to make up a 9-spot set. Write a few of these guesses on the board. Now for the investigation . . .

**the investigation**

Ask pupils whether 6-spot and 9-spot sets of dominoes are the only possibilities . . . and when one of them suggests 2-spot dominoes (or you have to), ask what dominoes you would need to make up a set. Write / draw their answers on the board until you've got the complete set (6 different dominoes for a 2-spot set). Don't arrange them in any specific order as ordering / completeness are things for pupils to think out for themselves later on.

Now they've got the idea, explain that you want them to work out the make-up of all the possible sets up to 6-spot ie a 0-spot set, a 1-spot set, a 2-spot set and so on . . . and that each time they should list all the dominoes in the set – and count them. Tell them they'll need to think carefully about recording their results and about how they can make sure they really have got all the dominoes for each set.

**practical**

Children can work in twos or threes. The whole thing can be done as a pencil and paper exercise but it's probably better to give each group of pupils a set of ordinary (6-spot) dominoes; it won't take them long to see that the smaller sets they're investigating are just subsets of this set.

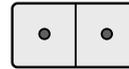
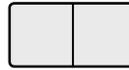
## results

This is not a difficult investigation, so you can expect broad agreement when it comes to results :

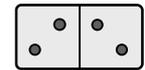
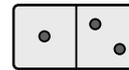
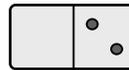
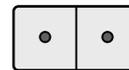
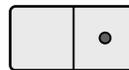
- there is only one 0-spot domino



- there are three dominoes in the 1-spot set



- there are six dominoes in the 2-spot set



and so on . . . so that finally we have this table of results :

domino set	no of dominoes in set
0-spot	1
1-spot	3
2-spot	6
3-spot	10
4-spot	15
5-spot	21
6-spot	28

Pupils might recognise the numbers in the right-hand column as the *triangle numbers*. Using differences, they can now work out from the table how many dominoes there will be in a 7-spot set of dominoes (ans 36), in an 8-spot set (ans 45) and finally in a 9-spot set (ans 55). Were any of the original guesses near?

**notes**

At some stage in the proceedings it's well worth getting the children to stop and think about

- how they can be absolutely sure of finding all the members of any particular set
  - how best to show their results
- 

**extension**

Dominoes are not the only number tiles . . .

