



# INVESTIGATION



Odd 13



It's odd numbers  
everywhere!

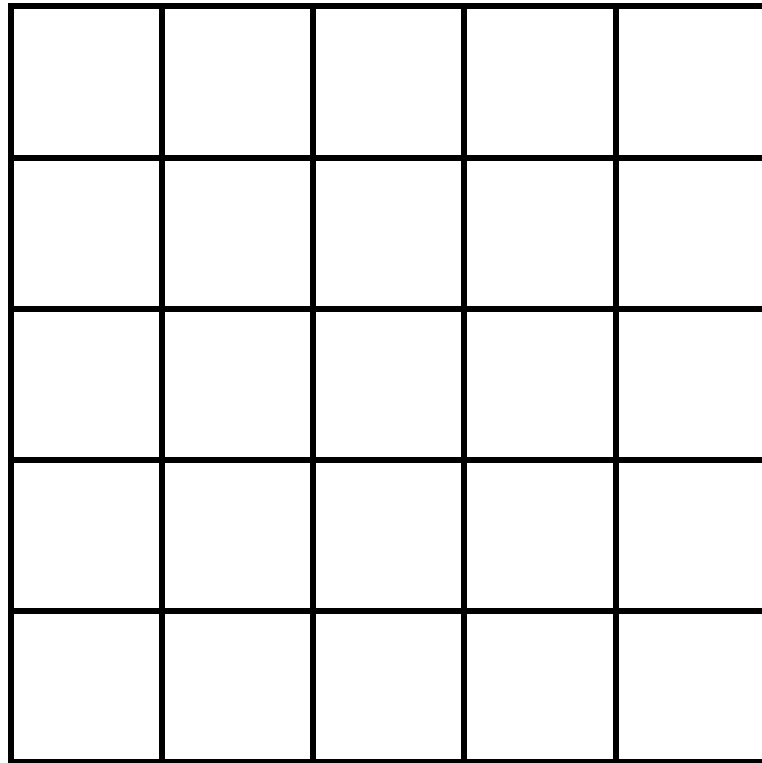
1 3 5 7 9 11 13

# MathSphere

## **Odd 13 Investigation**

### **Starter**

You need 13 counters to start you off on this investigation.



**Place the counters on the board so that each line across and down has an odd number of counters in it.**

**If you are really clever the two diagonals will also have an odd number of counters in them.**

**Can you find more than one way to do this?**

**Record your results carefully.**

## **Some Ideas**

**Work in a methodical way, recording your results carefully as you go.**

**Use counters on a board to help you place all 13.**

**Think about how to set out your results clearly.**

**Try to find as many rules and patterns as you can.**

**Have you checked that each row across and down and the two main diagonals all have an odd number of counters in - and that you have used all 13?**

**There is more than one way to do this - if you have found one way try to find another.**

**What would happen if you used 15 counters?**

**What would happen if you used 10 counters and tried to get an even number of counters in each row and column?**

**What would happen if you used a different sized square?**

## Answer Guide

A good deal of 'trial and error' goes into the initial stages of this investigation.

Encourage children to think about the problem and the limited possibilities there are. For example each row must have 1, 3 or 5 counters in it.

Try to get children to explain what they are doing and why they are doing it.

With ten counters the options are even more limited with 2 or 4 counters in each row.

There are several solutions. Look at the different ones for patterns, including symmetry.

Solution for 13 counters

●		●		●
		●		
●	●	●	●	●
		●		
●		●		●

Solution for 10 counters

●		●		
●	●			
		●	●	
	●			●
			●	●

Extensions of these could lead to children trying to devise their own puzzle on a smaller/larger board.