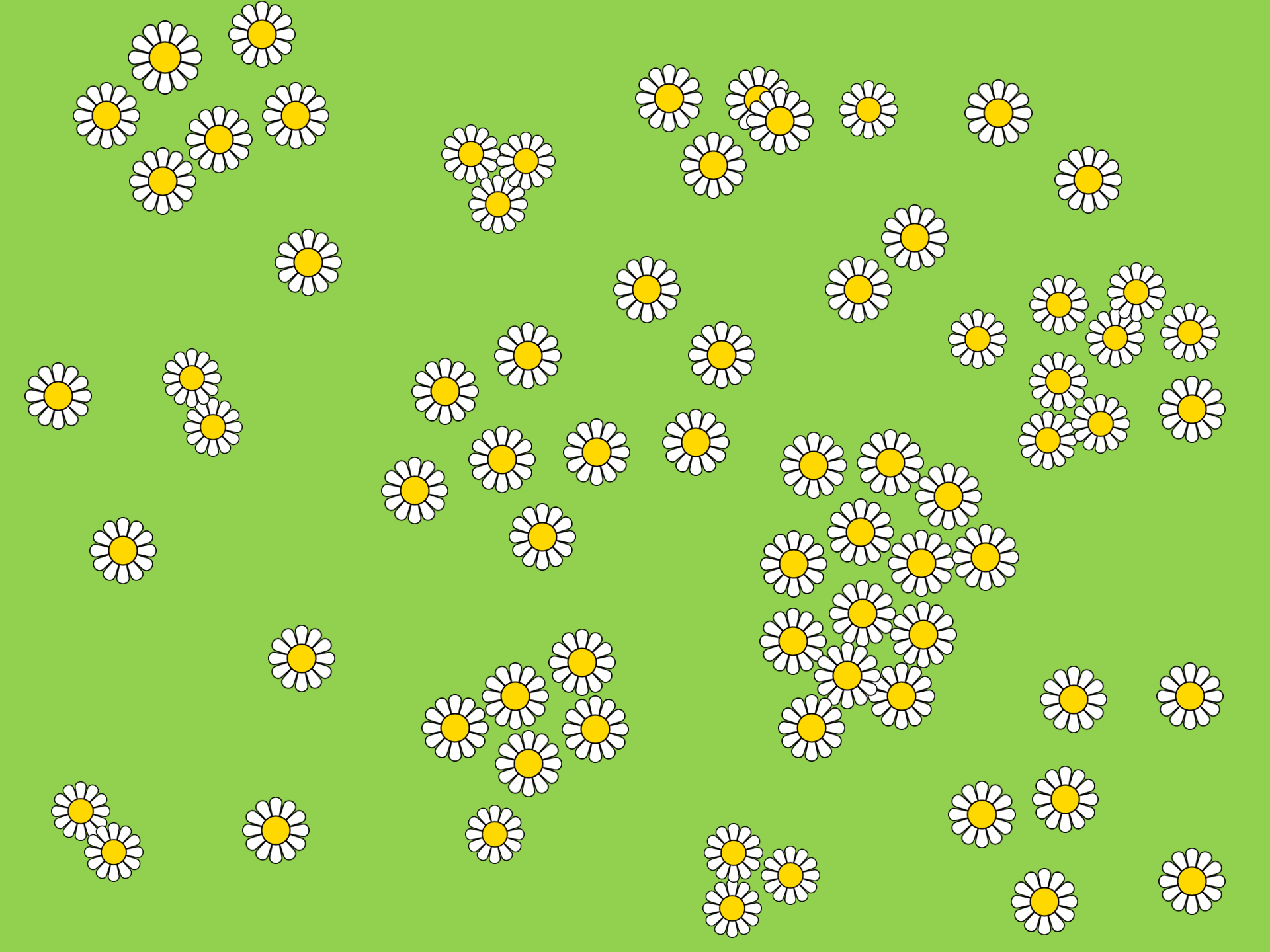
Topic	Quadrats and random sampling techniques	**Level**	GCSE (or any course for students aged 14-16)
Outcomes	1. To understand how to use a quadrat to estimate the population size of a plant species in a specific area 2. To use a running mean to justify your sample size		
Information for teachers	This lesson introduces students to random sampling and estimation of population sizes.		

Estimate how many daisies are in this field?

You have 20 seconds only.

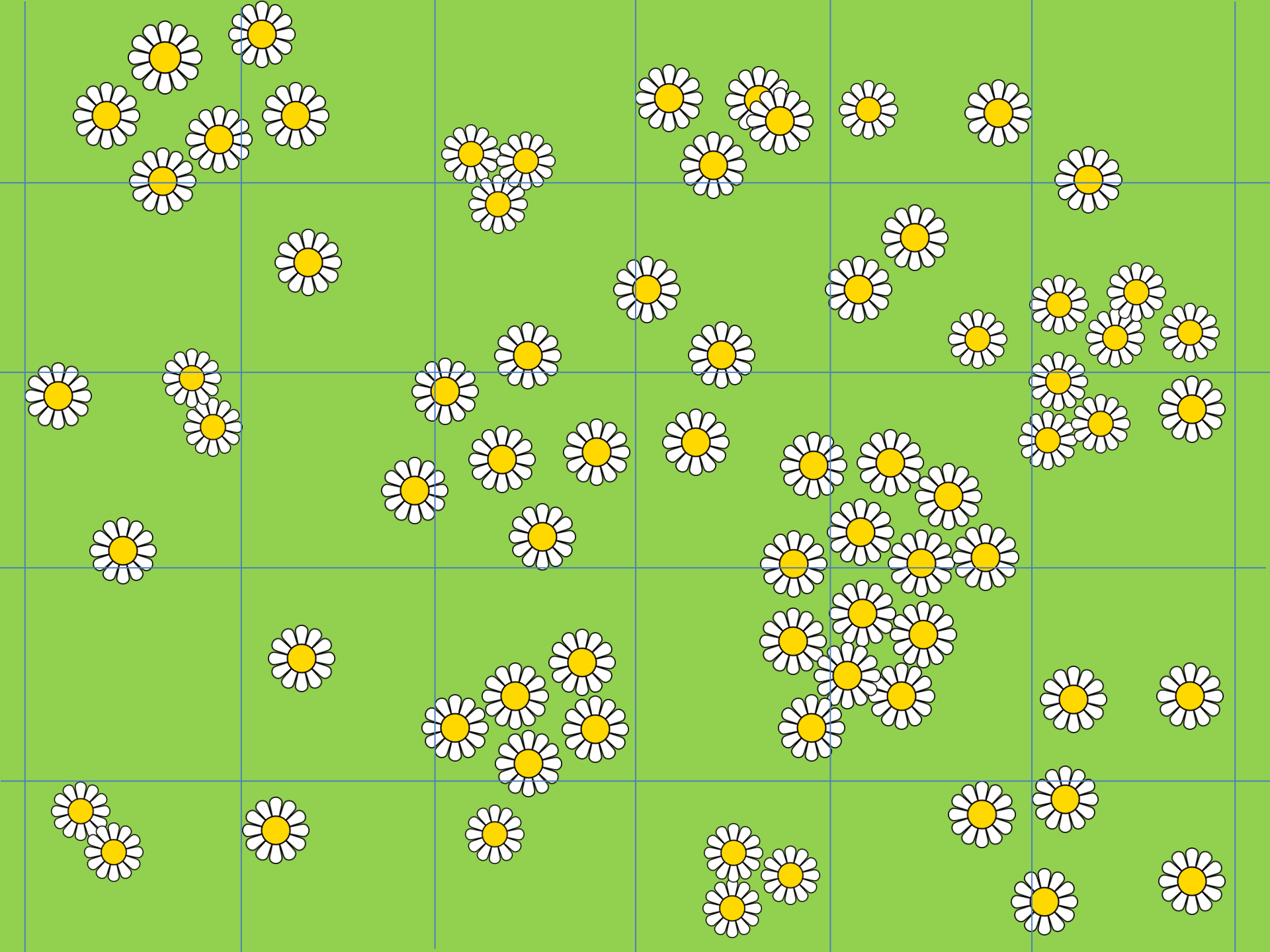


- How did you estimate the number of daisies?
- Did you try to count them all? Was this easy?
- Is there another method?

Write your first estimate down.

Estimate how many daisies are in this field?

You have 20 seconds only.

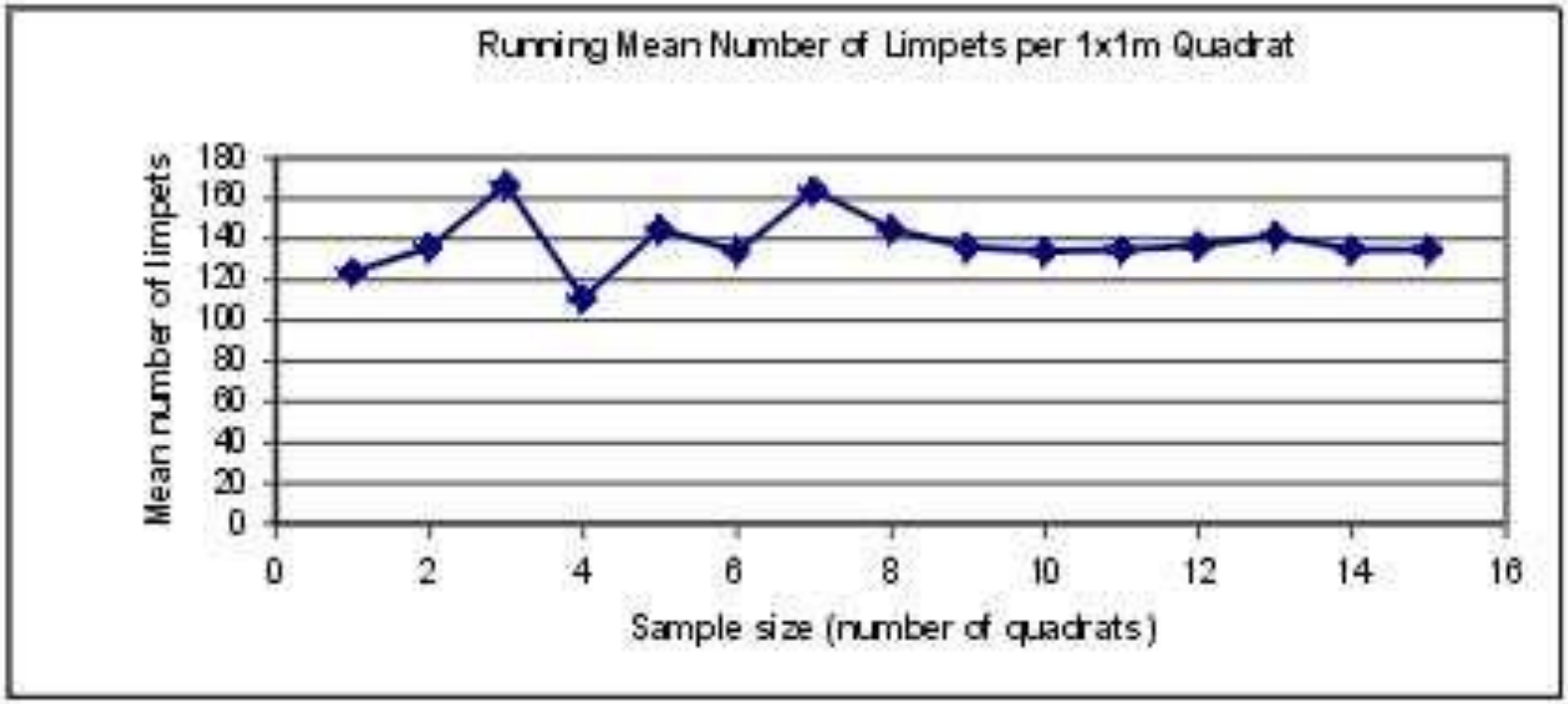


How did you use the grid to estimate the number of daisies? Did it help?

There are 73 daisies

We use a technique called **random sampling** with a piece of equipment called a **quadrat** to help us estimate the number of organisms in an area when it is too impractical to count them all.

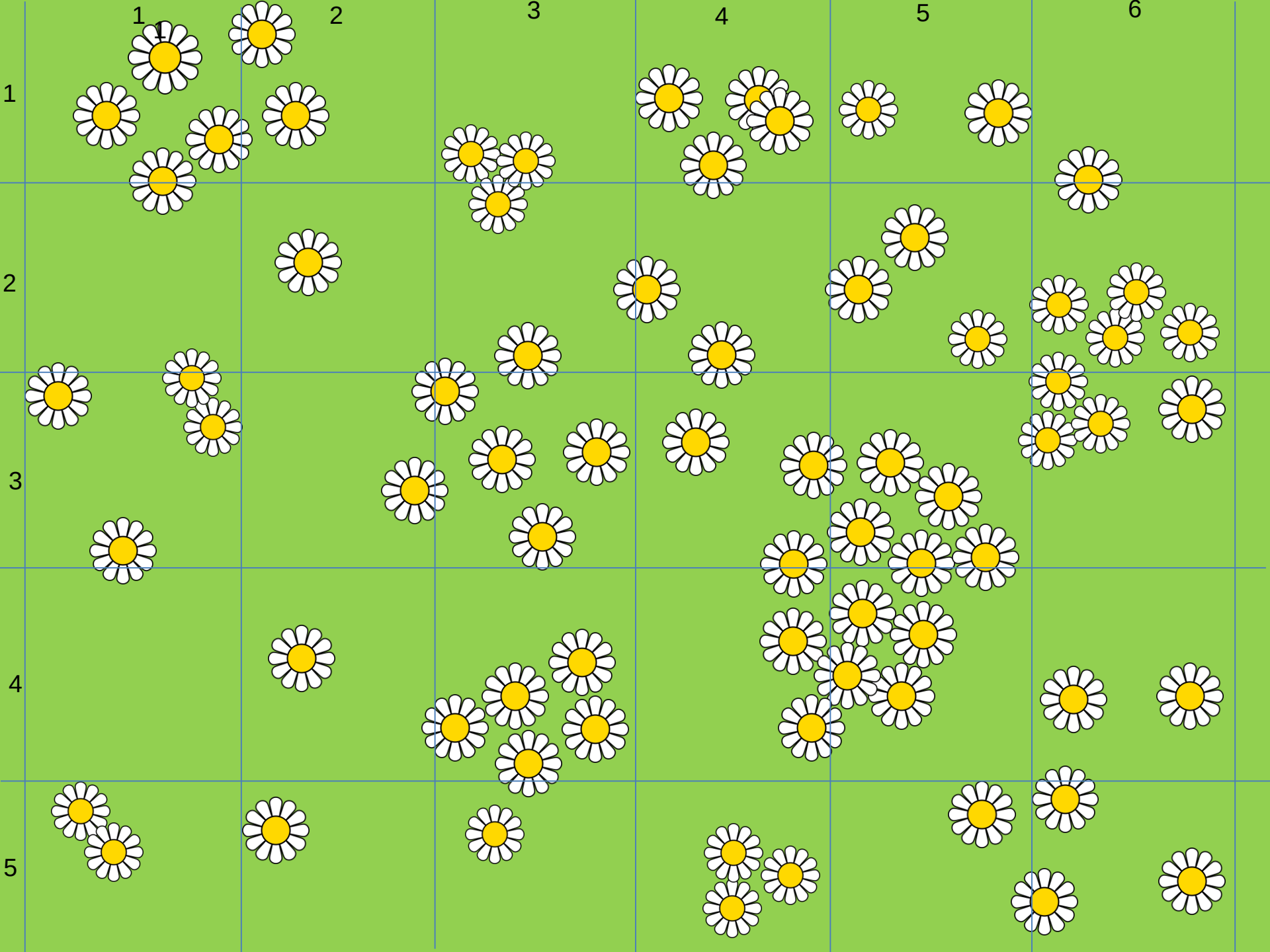
How many quadrats would you need to count?!



http://www.theseashore.org.uk/theseashore/Stats%20for%20twits/How%20big%20a%20sample.html

Let's see how good our estimation can be using a random sampling technique.

1. Place a ruler or tape measure along the two sides of the area being studied. Divide up your study area into non-overlapping quadrat-sized rectangles.
2. Write x and y co-ordinates along the sides of your paper (or field) at regular distances.
3. Randomly identify x and y coordinates to place down your quadrat.
4. Count and record the number of daisies inside the quadrat
   Record this data in the table and calculate the running mean.
   Plot a graph of sample number against running mean.
5. Repeat sets 3-4 until you have a large enough sample size
   Think! How will you know this from looking at your graph?
6. The field has an area of $30m^{2.}$ How many daisies do you estimate are in the field?
7. Is your estimation the same as the true value? If not, why not? How could you improve the accuracy of your estimation?


1
1
2
3
4
5
6
1
2
3
4
5

Sample number	Coordinates of the quadrat	Number of daisies in a $1m^2$ quadrat	Running mean number of daisies per $1m^2$ quadrat
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			