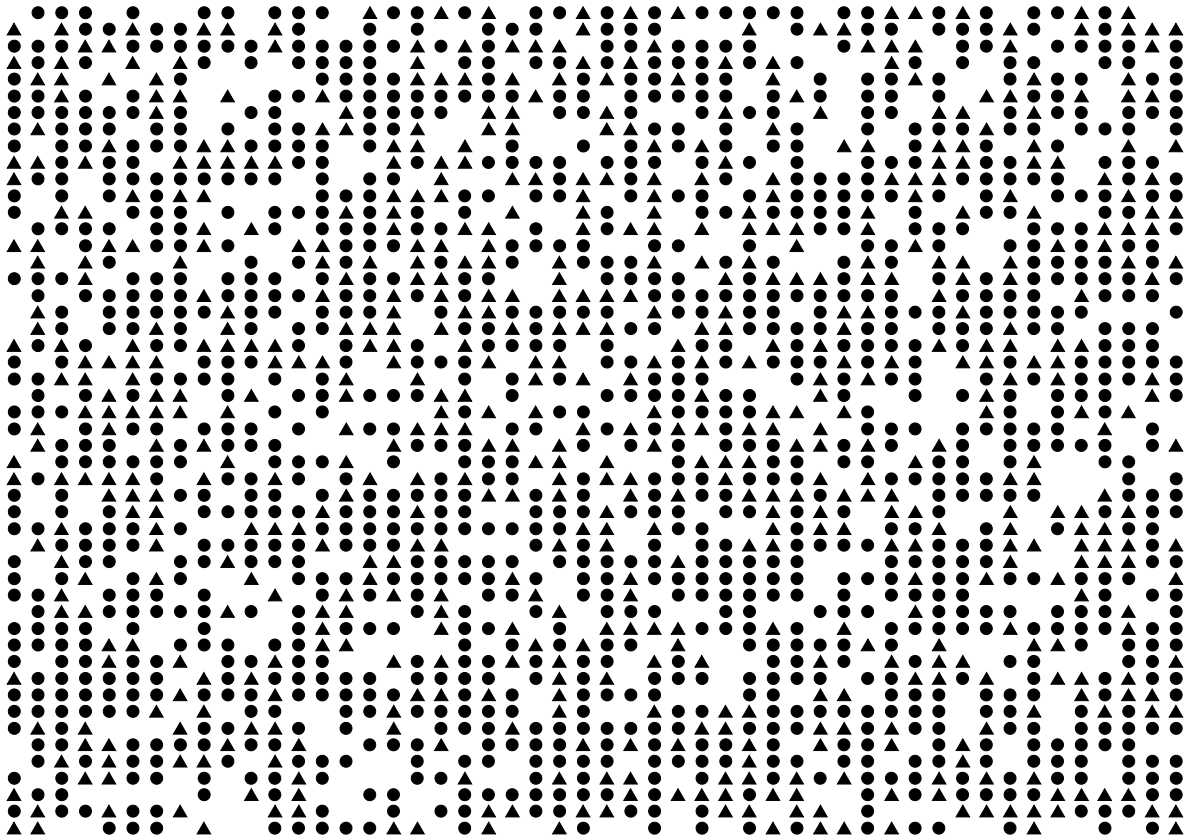


## Counting Trees



This diagram shows some trees in a plantation.

The circles ● show old trees and the triangles ▲ show young trees.

Tom wants to know how many trees there are of each type, but says it would take too long counting them all, one-by-one.

1. What method could he use to estimate the number of trees of each type?  
Explain your method fully.
2. On your worksheet, use your method to estimate the number of:
  - (a) Old trees
  - (b) Young trees

## Counting Trees: sample responses

Sample response: Laura

① You could multiply the number of trees in the length by the number of trees in the width and then half your answer.

② a. Old trees - 644  
Young trees - 644

width - 33  
length - 39.

$33 \times 39 = 1287$   
 $1287 \div 2 = 643.5 = 644$

Sample response: Jenny

1. there are 38 trees in each column  
there are around 11 young trees  
and around 27 old ones  
33 trees in each row so

$11 \times 33 = 363$   
 $27 \times 33 = \frac{891}{1254}$

2.  
a.  $11 \times 33 = 363 = \text{new trees.}$   
b.  $27 \times 33 = 891 = \text{old trees.}$

Sample response: Woody

2 columns has 21 young trees  
55 old trees

50 columns is approx  
 $50 \div 2 = 25$   
 $25 \times 21 =$  amount of young trees  $= 525$   
 $25 \times 55 =$  amount of old trees  $= 1,375$   
rounded up

young 530  
old 1,380

Sample response: Amber

Counting trees

1. If Tom draws a 10x10 square round some trees and counts how many old and new there are. There are 50 rows and 50 columns altogether so he must multiply by 25. He could do this a few times to check and then take the average.

2.

53 old	$\times 25 =$	1325 old	
28 new	$\times 25 =$	700 new	
19 spaces	$\times 25 =$	475 spaces	
<u>100</u>		<u>2500</u>	

$1325 + 700 \div 2 = 1262.5$   
 $700 + 875 \div 2 = 787.5$

check

48 old	$\times 25 =$	1200 old	So about 1263 old trees and 788 new trees
35 new	$\times 25 =$	875 new	
17 spaces	$\times 25 =$	425 spaces	
<u>100</u>		<u>2500</u>	

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## Counting Trees: assessing the sample responses

### **Sample response: Laura**

Laura attempts to estimate the number of old and new trees by multiplying the number along each side of the whole diagram and then halving. She does not account for gaps nor does she realise that there are an unequal number of trees of each kind.

*What questions could you ask Laura that would help her improve her response?*

### **Sample response: Jenny**

Jenny realises that sampling is needed, but she multiplies the number of young trees and old trees in the left hand column by the number of trees in the bottom row. She ignores the columns with no trees in the bottom row, so her method underestimates the total number of trees. She does, however, take account of the different numbers of old and new trees.

*What questions could you ask Jenny that would help her improve her response?*

### **Sample response: Woody**

Woody uses a sample of two columns and counts the number of old and young trees. He then multiplies by 25 (half of 50 columns) to find an estimate of the total number.

*What questions could you ask Woody that would help him improve his response?*

### **Sample response: Amber**

Amber chooses a representative sample and carries through her work to get a reasonable answer. She correctly uses proportional reasoning. She checks her work as she goes along by counting the gaps in the trees. Her work is clear and easy to follow.

*What questions could you ask Amber that would help her improve her response?*