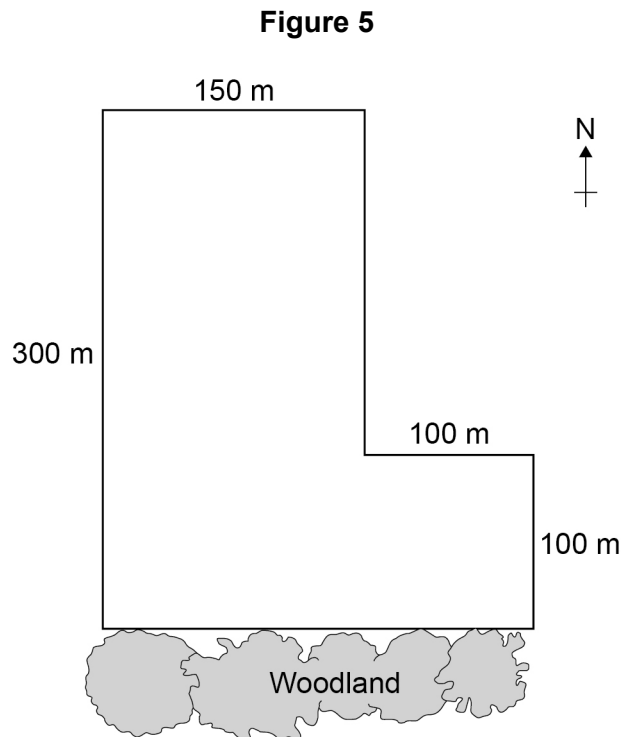


0 4

Some students investigated the size of a population of dandelion plants in a field.

Figure 5 shows the field.



The students:

- placed a 1 m x 1 m square quadrat at 10 random positions in the field
- counted the number of dandelion plants in each quadrat.

Table 2 shows the students' results.

Table 2

Quadrat number	Number of dandelion plants
1	6
2	9
3	5
4	8
5	0
6	10
7	2
8	1
9	8
10	11



0 4 . 4

Light is an environmental factor that affects the growth of dandelion plants.

Give **two** other environmental factors that affect the growth of dandelion plants.

[2 marks]

1 _____

2 _____

Turn over for the next question

*Do not write
outside the
box*

14

Turn over ►



Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	there is an uneven distribution of dandelions or (more) representative / valid or avoid bias or more accurate / precise mean	ignore accurate / precise unqualified ignore repeatability / reproducibility / reliability / fair test	1	AO1 4.7.2.1
04.2	(correct mean per m ² =) 6 or 6.0 (correct field area =) 55 000 (m ²) mean x area – eg 6(.0) × 55 000 330 000 3.3 × 10 ⁵	an answer of 3.3 × 10 ⁵ scores 5 marks an answer of 330 000 scores 4 marks allow incorrect calculated values for mean and / or field area allow correct calculation from previous calculation allow calculated value in standard form	1 1 1 1 1	AO2 4.7.2.1

Question	Answers	Mark	AO / Spec. Ref.	
04.3	Level 3: The method would lead to the production of a valid outcome. All key steps are identified and logically sequenced.	5–6	AO3	
	Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.	3–4	AO2	
	Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.	1–2	AO1	
	No relevant content	0		
	Indicative content <ul style="list-style-type: none"> • placing of quadrat • large number of quadrats used • how randomness achieved – eg table of random numbers or random number button on calculator or along transect • quadrats placed at coordinates or regular intervals along transect • in each of two areas of different light intensities or transect running through areas of different light intensity • for each quadrat count number of dandelions • for each quadrat measure light intensity • compare data from different light intensity <p>to access level 3 the key ideas of using a large number of quadrats randomly, or along a transect, and counting the number of dandelions in areas of differing light intensity need to be given to produce a valid outcome</p>		4.7.2.1	
04.4	any two from: <ul style="list-style-type: none"> • temperature • water • (soil) pH • minerals / ions • wind • herbivores 	allow heat allow moisture / rain allow acidity allow eg magnesium ions or nitrate allow salts / nutrients allow trampling ignore carbon dioxide ignore space ignore competition unqualified do not accept oxygen	2	AO1 4.4.1.2 4.7.1.2
Total		14		