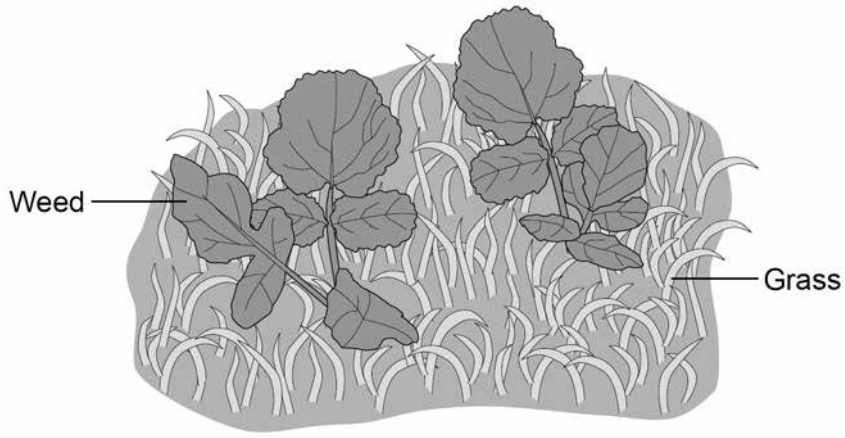
Do not write outside the box

0 6 Some weed killers are selective.

Selective weed killers kill broad-leaved weed plants, but do **not** kill narrow-leaved grass plants.

Figure 8 shows some weeds growing on a grassy lawn.

Figure 8



Some students investigated the effect of a selective weed killer on the weeds growing in a lawn. They used 0.5 m × 0.5 m quadrats.

The lawn was 20 metres long and 10 metres wide.

This is the method used.

1. Divide the lawn into two halves, side **A** and side **B**.
2. Place 5 quadrats in different positions on side **A**.
3. Place 5 more quadrats in different positions on side **B**.
4. Count the number of weed plants in each quadrat.
5. Spray side **A** with weed killer solution.
6. Spray side **B** with the same volume of water.
7. Repeat steps 2-4 after 2 weeks.

0 6 . 1 Suggest a method the students should have used to place each quadrat.

[1 mark]

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0 6 . 2 Give the reason for the method you suggested in Question **06.1**.

[1 mark]

0 6 . 3 Explain why the students used water on one side of the lawn instead of weed killer.

[2 marks]

Table 3 shows the students' results.

Table 3

	Number of weeds per quadrat			
	At start		After 2 weeks	
	Side A (Weed killer)	Side B (Water)	Side A (Weed killer)	Side B (Water)
	8	14	3	8
	2	9	4	15
	12	3	0	7
	15	16	2	12
	13	3	1	13
Mean	10	9	2	**X**

0 6 . 4 Calculate the mean value, **X**, in **Table 3**.

[1 mark]

Mean value, **X** = _____

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0 6 . 5 Calculate the percentage decrease in the number of weeds on side **A** after 2 weeks.

[2 marks]

Use the following equation:

$$\text{percentage decrease} = \frac{(\text{mean at start} - \text{mean after 2 weeks})}{\text{mean at start}} \times 100$$

Percentage decrease = _____

0 6 . 6 One student thought the results were **not** valid.

Suggest **one** improvement the students could have made to the method to make the results more valid.

Give the reason for your answer.

[2 marks]

Improvement _____

Reason _____

9

Turn over for the next question

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	description of a method to achieve random placement	examples could include random number generator or random coordinates allow throw over the shoulder **or** with eyes shut ignore throw unqualified	1	AO1 4.7.2.1
06.2	any **one** from: • random (location) • avoid bias • obtain valid / representative results	allow by chance allow more accurate / precise mean ignore fair test / accurate / precise unqualified	1	AO1 4.7.2.1
06.3	as a control / comparison **or** B varies from A in only one factor (to) show results (in A) are due to weed killer	allow see the difference do **not** accept a control variable allow to see the effect of the weed killer allow so the results are valid	1 1	AO2 4.7.2.1 AO3 4.7.2.1
06.4	11	allow eleven	1	AO2 4.7.2.1
06.5	$\frac{10 - 2}{10} \times 100$ 80	an answer of 80 scores **2** marks	1 1	AO2 4.7.2.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.6	use more quadrats	allow use larger quadrats allow repeat	1	AO3 4.7.2.1
	original may not be representative **or** reference to weeds being distributed unevenly	allow mean is more reliable / accurate / precise ignore more valid	1	
	or leave for more than two weeks (1) original may not be representative (1)	allow mean is more reliable / accurate / precise allow weed killer may take longer than two weeks to work (fully) ignore more valid		
Total			**9**	