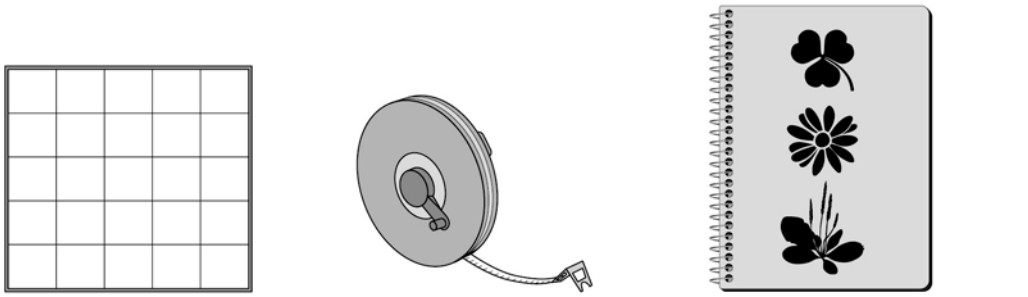
0 3 A student was asked to estimate how many clover plants there are in the school field.

Figure 4 shows the equipment used.

Figure 4



Not drawn to scale

This is the method used.

1. Throw a quadrat over your shoulder.
2. Count the number of clover plants inside the quadrat.
3. Repeat step **1** and step **2** four more times.
4. Estimate the number of clover plants in the whole field.

0 3 . 1 What is the tape in **Figure 4** used for in this investigation?

[1 mark]

0 3 . 2 The teacher told the student that throwing the quadrat over his shoulder was **not** random.

The method could be improved to make sure the quadrats were placed randomly.

Suggest **one** change the student could make to ensure the quadrats were placed randomly.

[1 mark]

0 3 . 3 How could the student improve the investigation so that a valid estimate can be made?

[2 marks]

Tick **two** boxes.

- Weigh the clover plants ☐
- Compare their results with another student's results ☐
- Count the leaves of the clover plants ☐
- Place more quadrats ☐
- Place the quadrats in a line across the field ☐

Question 3 continues on the next page

Table 1 shows the student's results.

Table 1

Quadrat number	Number of clover plants counted
1	11
2	8
3	11
4	9
5	1
Total	40

0 3 . 4 The area of the school field was 500 m^2.

The quadrat used in **Table 1** had an area of 0.25 m^2.

Calculate the estimated number of clover plants in the school field.

[3 marks]

Estimated number of clover plants = _____

0 3 . 5 What was the mode for the results in **Table 1**?

[1 mark]

Tick **one** box.

1 ☐

8 ☐

11 ☐

40 ☐

0 3 . 6 Suggest which quadrat could have been placed under the shade of a large tree.

Give **one** reason for your answer.

[1 mark]

Quadrat number _____

Reason _____

_____

Turn over for the next question

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	measure the length / area of the field		1	AO1/2 4.7.2.1
03.2	use (a) random number(s) (generator) **or** use coordinates method explained		1	AO3/3b 4.7.2.1
03.3	compare their results with another student's results place more quadrats		1 1	AO3/3b 4.7.2.1 AO3/3b 4.7.2.1
03.4	0.25 × 5 = 1.25 500/1.25 = 400 (40 × 400 =) 16 000	 allow 16 000 with no working shown for **3** marks	1 1 1	AO2/2 4.7.2.1 AO2/2 4.7.2.1 AO2/2 4.7.2.1
03.5	11		1	AO2/1 4.7.2.1
03.6	(quadrat) 5 very few or only 2 growing (here)	both quadrat number and correct reason must be given for **1** mark	1	AO3/2b 4.7.2.1
Total			**9**	