

Using Transects and Quadrats

Q:1 Red squirrels live in trees. They eat seeds from the cones of conifer trees. Squirrels store cones in 'larders' on the ground. These larders provide food through the winter. Each red squirrel makes and defends one larder.

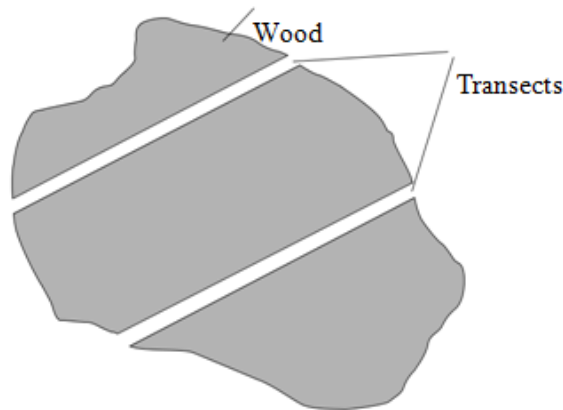
Scientists monitor squirrel numbers to find the best habitats for the squirrel's survival. In one investigation, scientists estimated the numbers of squirrels in different types of woodland. Each woodland contains a different species of conifer tree.

Here is their method.

1 Ten woods of each type of woodland were surveyed.

2 In each wood scientists measured out two transects (strips), each 600 m long and 10 m wide.

3 A scientist walked slowly down the centre of each transect, recording the number of squirrel larders he could see.



(a) (i) How many transects all together did the scientists survey in each type of woodland?

Number of transects _____

(1 mark)

(ii) What was the total area surveyed in one wood?

Area _____ m²

(1 mark)

(b) Name one variable that was controlled in this investigation.

(1 mark)

(c)(i) The scientists recorded the number of ladders instead of the number of squirrels they saw.

Explain how this could have increased the accuracy of the investigation.

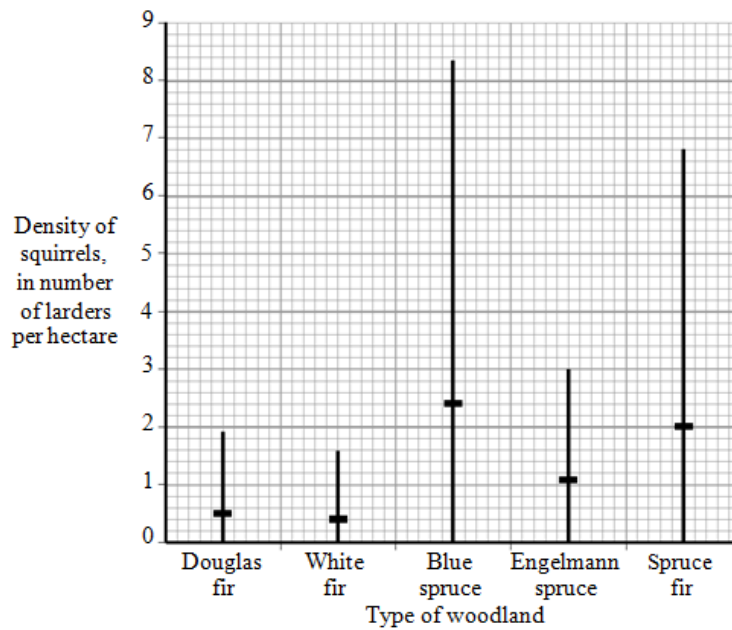
(1 mark)

(ii) This method of counting the number of ladders could have led to an inaccurate estimate of the number of squirrels.

Explain how.

(2 marks)

(d) The results of the investigation are shown in the graph.



The horizontal mark on each bar represents the mean number of ladders per hectare of woodland.

The range of the number of ladders observed for Douglas fir woodland was 0 to 1.9 per hectare.

(i) What was the range of the number of ladders per hectare in the Spruce fir woodland?

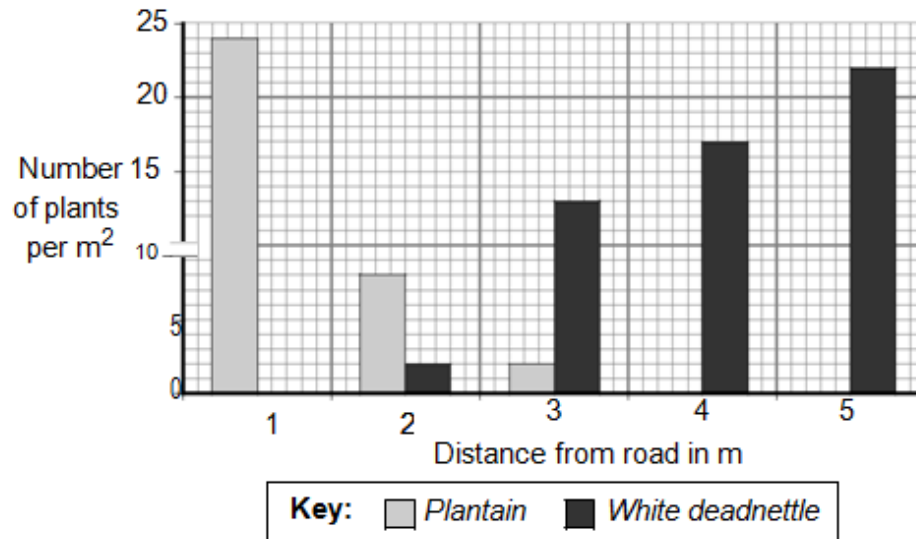
(1 mark)

(ii) The highest mean number of ladders per hectare was found in Blue spruce woodland.

Suggest one explanation for this.

(1 mark)

Q:2 Students investigated the distribution of two plant species near a busy road. The bar chart shows their results.



(a) (i) Name the piece of apparatus used in sampling a 1m² piece of land.

(1 mark)

(a) (ii) Describe how this piece of apparatus could be used to obtain the data shown in the bar chart.

(2 marks)

(a) (iii) Describe the pattern shown in the data for the Plantain plants.

(1 mark)

(b) Suggest explanations for:

(b) (i) the distribution of the White deadnettle plants

(2 marks)

(b) (ii) the distribution of the Plantain plants.

(2 marks)

Q:3 Some students wanted to find the number of thistle plants growing on a lawn. The students placed 10 quadrats at different positions on the lawn.

Each quadrat measured 1 metre × 1 metre.

The students counted the number of thistle plants in each quadrat.

(a) Which method should the students use to decide where to place the 10 quadrats?

Tick (☑) one box.

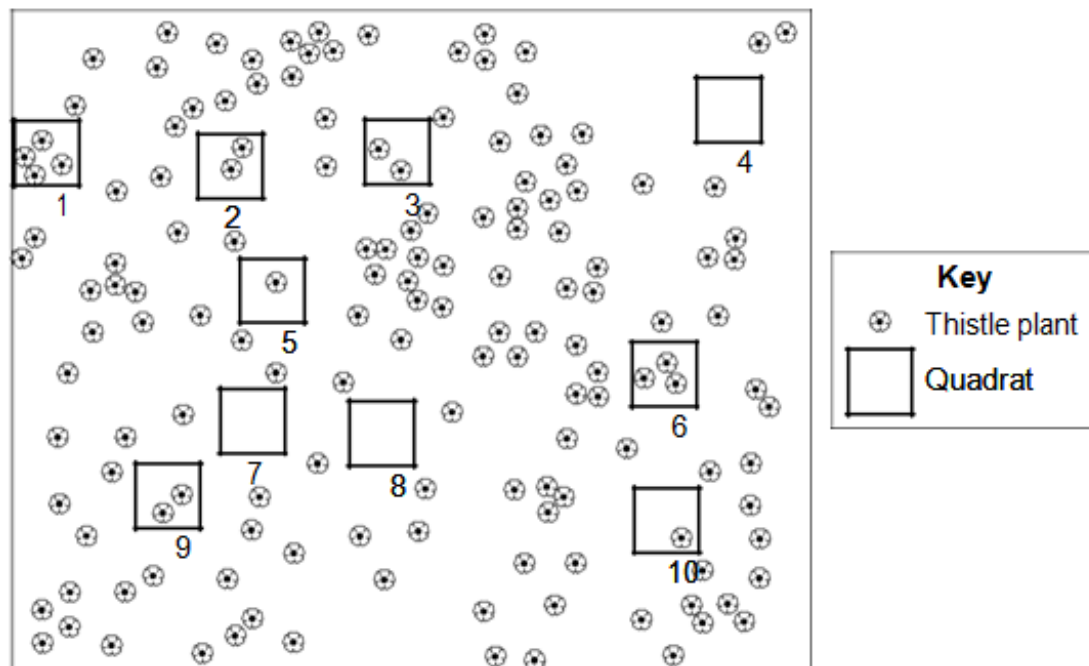
Place the quadrats as evenly as possible around the lawn.

Place 5 quadrats in areas with many thistle plants and 5 quadrats in areas with only a few thistle plants.

Place all the quadrats randomly on the lawn.

(1 mark)

(b) The diagram shows the lawn with the positions of the thistle plants and the students' 10 quadrats.



(b) (i) Complete the table to show:

- how many thistle plants the students found in each of the first four quadrats
- the total number of thistle plants found in all 10 quadrats.

Quadrat number	Number of thistle plants in each quadrat
1	
2	
3	
4	
5	1
6	3
7	0
8	0
9	2
10	1
Total	

(2 marks)

(b) (ii) Calculate the mean number of thistle plants in one quadrat.

Mean = _____

(1 mark)

(b) (iii) The lawn measured 12 metres long and 10 metres wide.

Use your answer from part (b)(ii) to estimate the number of thistle plants on the lawn.

Estimated number of thistle plants = _____

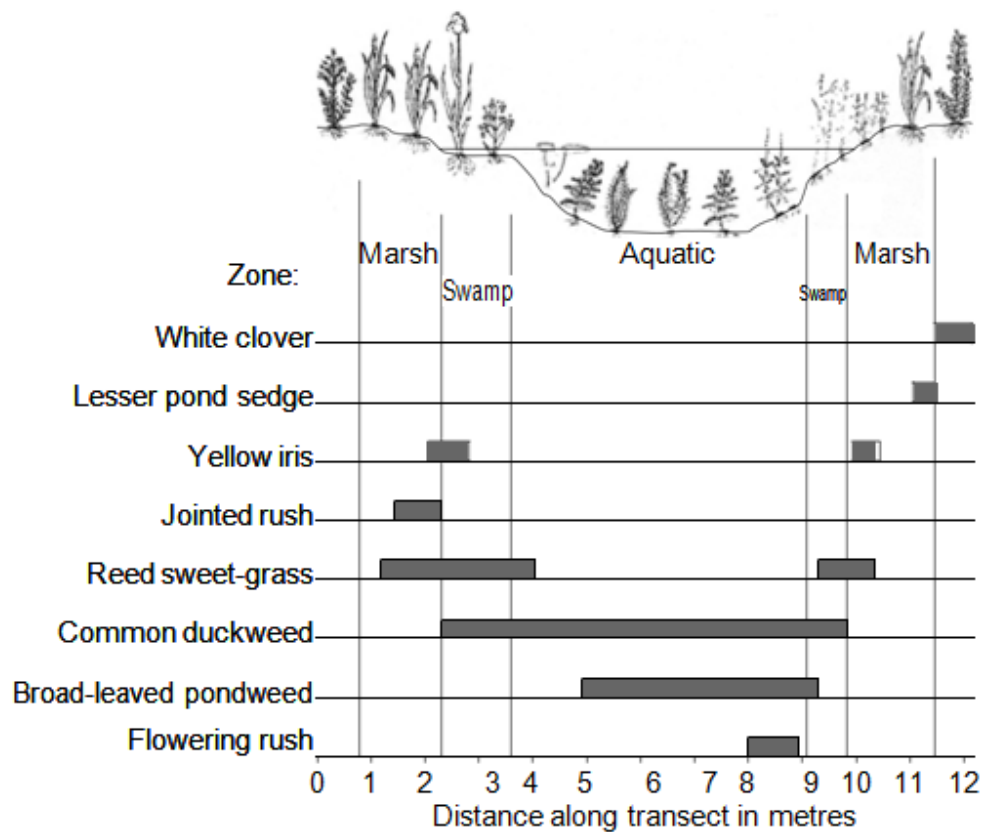
(2 marks)

(c) How could the students make their estimate more accurate?

(1 mark)

Q:4 Some students investigated the distribution of some of the plants growing in and around a shallow stream. They sampled along a transect line.

The diagram shows their results.



(a) (i) Name the one species that grew only in the driest conditions.

(1 mark)

(a) (ii) Only one species grew in the marsh, the swamp and in the aquatic zones.

Which species?

(1 mark)

(a) (iii) Duckweed grows floating in water. What evidence is there for this in the students' results?

(1 mark)

(b) In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

Describe how you would use a 12 -metre 12 -metre quadrat frame and a 30-metre tape measure to obtain data similar to the data shown in the diagram.

You should include details of how you would make sure that you would obtain valid results.

(6 marks)

TOTAL MARKS=32