UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE
NAME

CENTRE
NUMBER

CANDIDATE
NUMBER

GEOGRAPHY **0460/04**

Paper 4 Alternative to Coursework **October/November 2009**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Ruler

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE ON ANY BARCODES.

Answer **all** questions.
The Insert contains Fig. 1 and Tables 1 and 2 for Question 1 and Table 4 for Question 2.
The Insert is **not** required by the Examiner.
Sketch maps and diagrams should be drawn whenever they serve to illustrate an answer.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
Q1	
Q2	
Total	

This document consists of **15** printed pages, **1** blank page, and **1** Insert.

UNIVERSITY *of* CAMBRIDGE
International Examinations

[Turn over

1 A major impact of many people visiting countryside areas is the increase in footpath erosion. A lot of people walking over open ground presses down the soil and wears it away. Evidence used to indicate the amount of footpath erosion may involve factors such as:

- the percentage of bare ground

- the height of vegetation

- infiltration time (how long it takes water to soak into the soil)

Students who wanted to investigate the impact of this erosion decided to test the following hypotheses:

Hypothesis 1: *Footpath erosion decreases away from the centre of the footpath.*

Hypothesis 2: *Footpath erosion affects the rate at which water soaks into the soil.*

The students carried out their investigation on a path that was very popular for walkers. They chose three sites at varying distances from the car park.
These sites are shown on Fig. 1 (Insert).
At each site, the students carried out their investigation across a 10 metre transect. This is shown in Fig. 2.
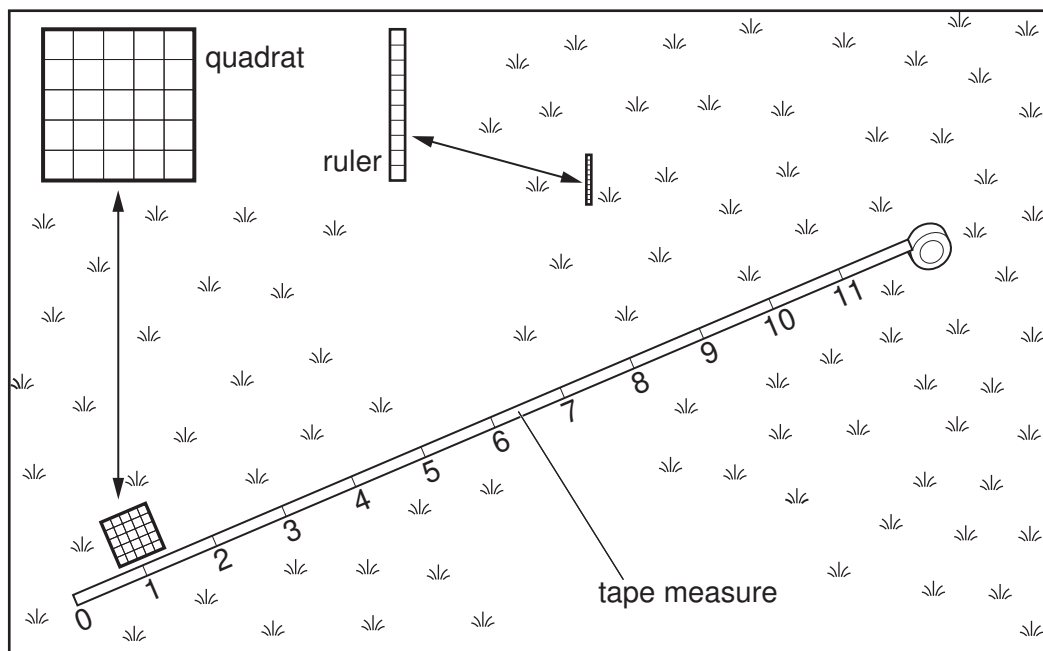
Investigation site and equipment used

Fig. 2

3

(a) (i) First the students investigated vegetation and bare ground across each transect.

The results of this investigation at Site A are shown in Table 1 (Insert).

How were the results shown in Table 1 obtained?

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(ii) Use the results in Table 1 (Insert) to complete the 'kite' diagram, Fig. 3, to show the percentage of bare ground at sample points 10 and 11 across the transect at Site A. Complete the shading to show the amount of bare ground. [3]

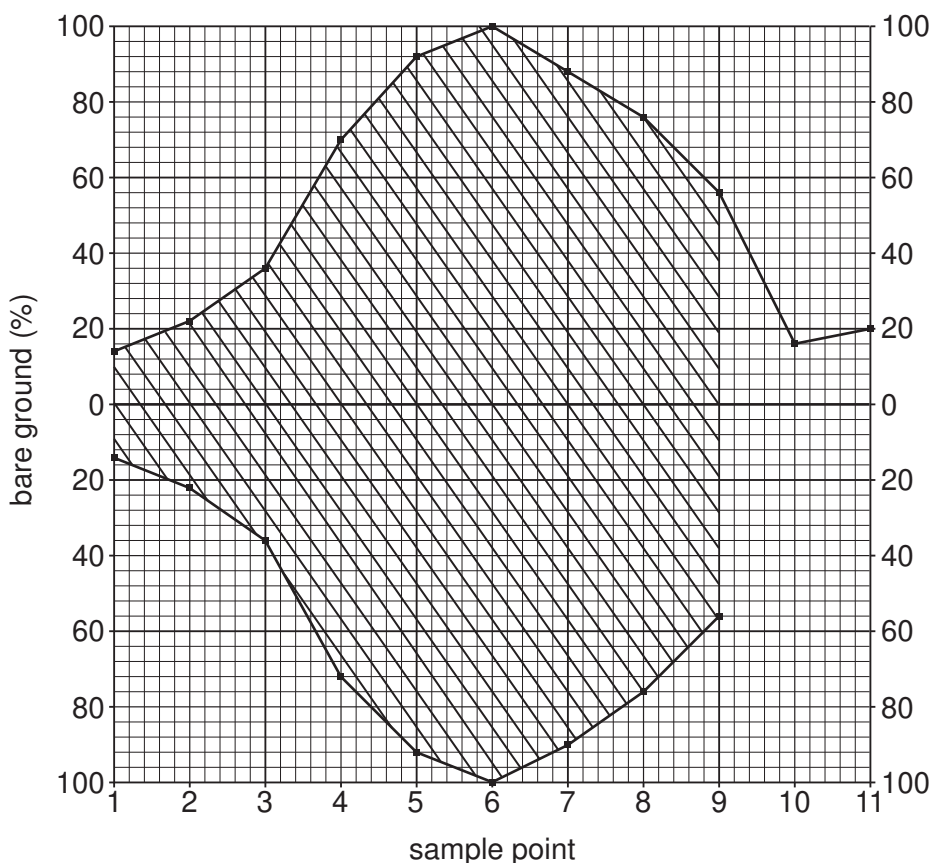**Percentage of bare ground across
the transect at Site A**

Fig. 3

(iii) Use the results in Table 1 (Insert) to complete Fig. 4, to show the average height of vegetation at points 8, 9, 10 and 11 across the transect at Site A. [2]

Average height of vegetation at Site A
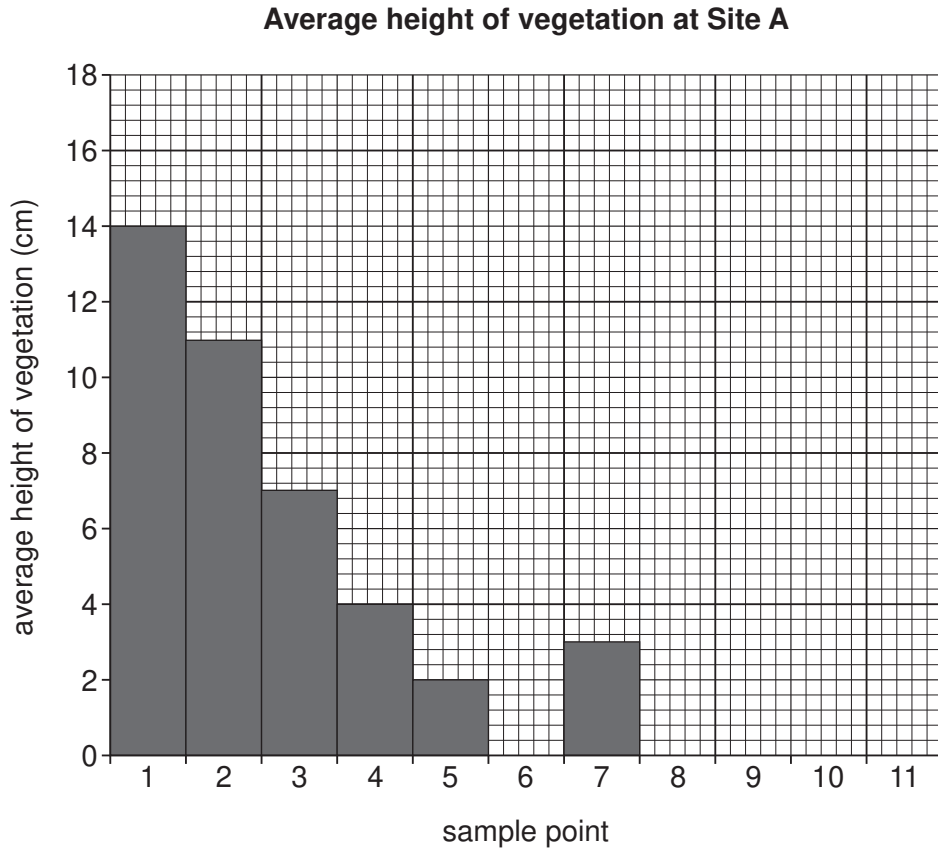
Fig. 4

(iv) What conclusion could the students make about **Hypothesis 1**, *Footpath erosion decreases away from the centre of the footpath*? What evidence supports this conclusion?

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(b) (i) Next, the students investigated infiltration of water into the soil across the transect. Study Fig. 5, which shows the equipment used by the students to measure infiltration. Their results are shown in Table 2 (Insert).

Equipment used to measure infiltration
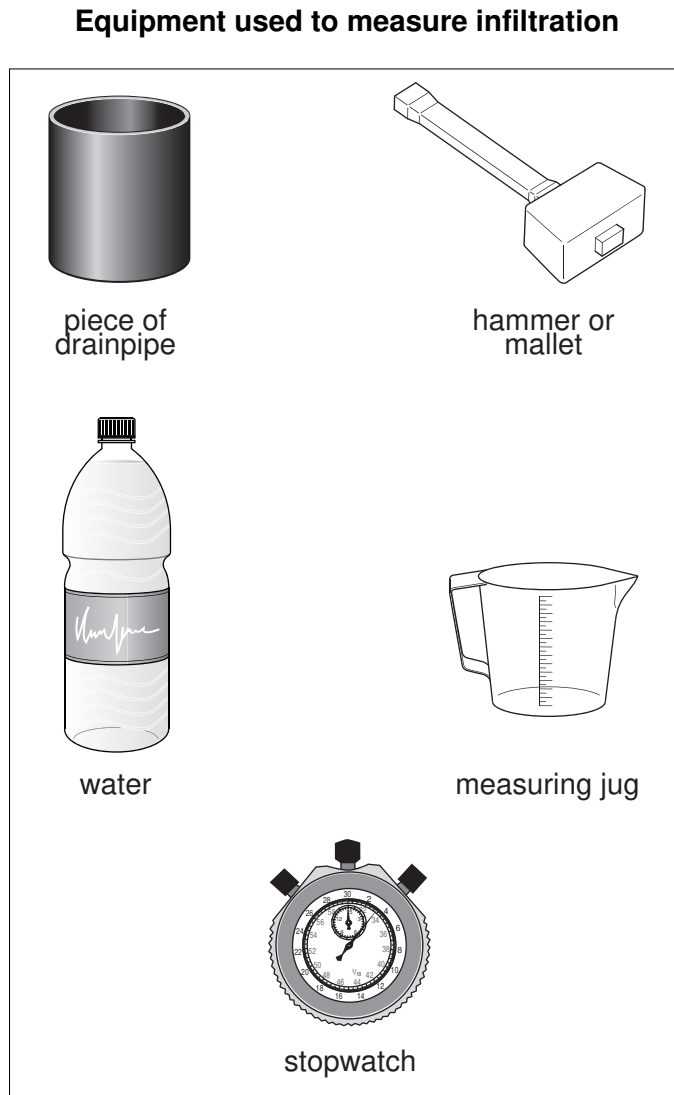
Fig. 5

Explain how they carried out this investigation.

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(ii) Use the results shown in Table 2 (Insert) to complete Fig. 6, to show the infiltration times at points 9, 10 and 11 across the transect. [2]
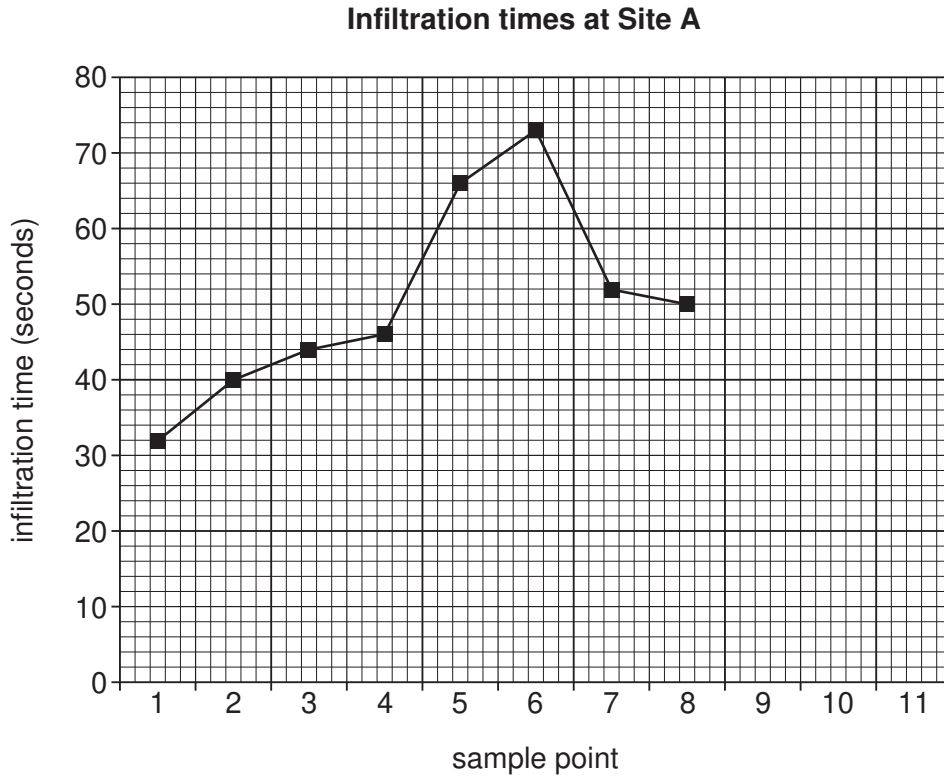
Infiltration times at Site A

Fig. 6

(iii) Look again at Table 1 (Insert) and Fig. 6. What is the relationship between the percentage of bare ground and the infiltration time at the sample points at Site A?

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....[1]

(iv) Suggest why the infiltration time increases towards the centre of the path.

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....[2]

(c) The students did the same investigations at Sites B and C, shown on Fig. 1 (Insert). How and why might these results differ from those at Site A?

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(d) In this investigation into footpath erosion, the students studied the amount of vegetation cover and the rate at which water soaks into the soil. How might the following suggestions have improved their investigation?

A pedestrian count

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A questionnaire

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Repeating the study at different times of the year

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(e) What techniques can be used to protect the natural environment in parts of the countryside which are popular with tourists?

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[Total: 30 marks]

2 Students wanted to investigate the quality of the urban landscape in different parts of their town. To do this they decided to carry out an environmental survey, to find out if the quality of the environment varies between streets.

They decided to focus their investigation on the following hypotheses:

Hypothesis 1: *The quality of the environment is affected by the type of land use.*

Hypothesis 2: *The quality of the environment varies with distance from the town centre.*

The students selected 20 streets to survey. Their selection criteria were:

- the street must have one main land use

- the streets must be at different distances from the town centre

They decided to have four land use categories:

- residential

- industrial

- shopping

- open space

(a) The positions of the survey sites are shown on Fig. 7.

Positions of survey sites
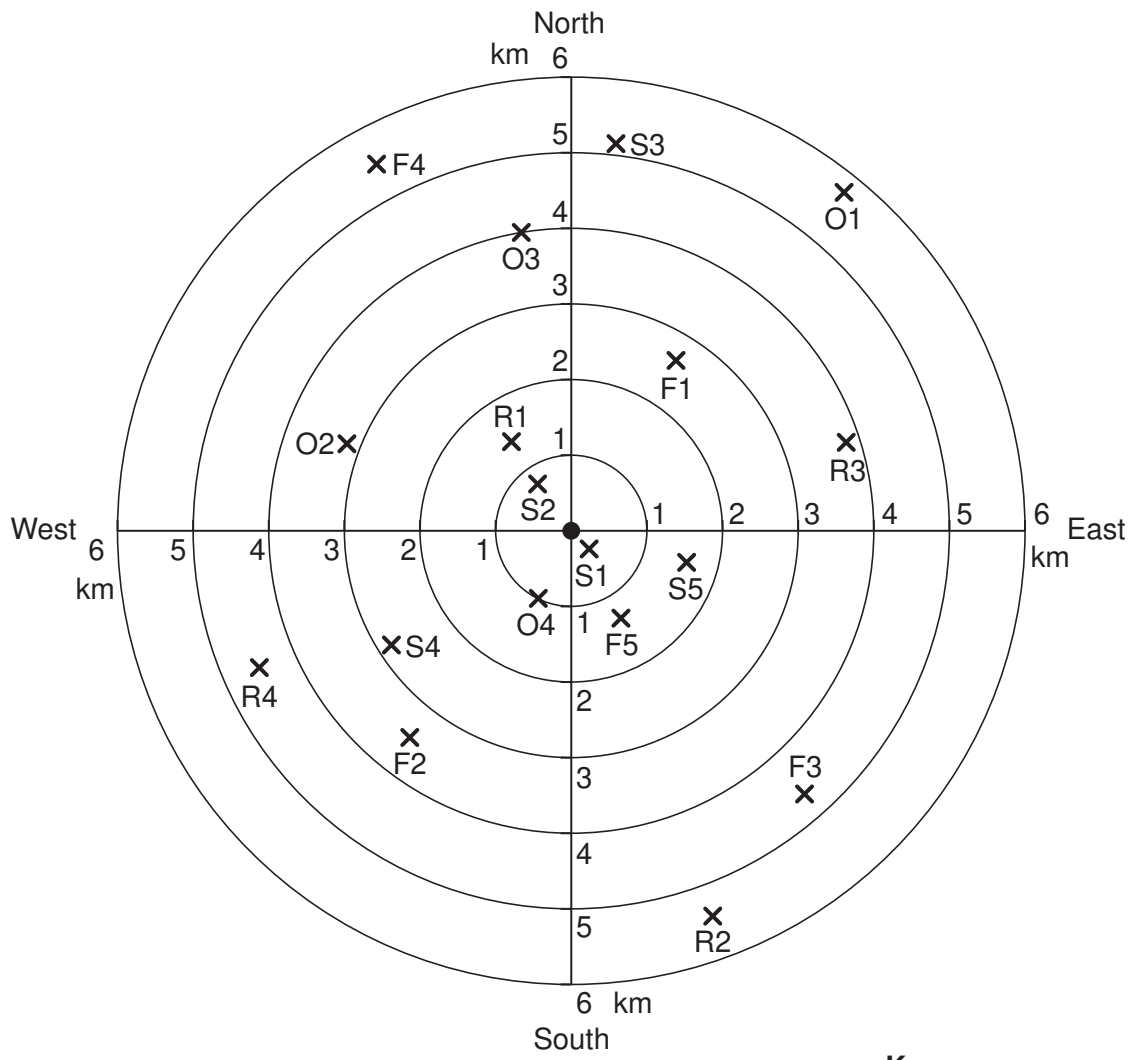
Fig. 7

Complete Fig. 7 by marking on the position of the final two streets, using the information below.

Land use	Reference number	Distance from town centre (km)	Direction from town centre
residential	R5	2.0	north east
open space	O5	4.5	south west

[2]

(b) The students produced an environmental quality reference sheet to use at each site. This is shown in Table 3.

Table 3

Environmental quality reference sheet

Category	Description	Score
Litter	No litter	3
	Small amount of litter	2
	A lot of litter	1
	All kinds of litter scattered widely	0
Roads and pavements	Well maintained	3
	Slightly uneven	2
	Uneven	1
	Very poor condition	0
Trees, shrubs and grass	Well kept	3
	Badly kept or poor quality	2
	Damaged trees and shrubs, grass not cut	1
	Derelict and unplanted areas	0
Street furniture (lamp posts, telephone boxes, street lights, bins)	Well designed and in good condition	3
	Adequate provision, satisfactory condition	2
	Missing or inadequate	1
	Badly cared for or vandalised	0
Road signs	Well placed and visible	3
	Badly placed	2
	Confusing and cluttered	1
	Inadequate information	0
Traffic		3
		2
		1
		0
Noise	Low level noise	3
		2
	Frequent disturbing and distracting noise	1
		0

(i) Complete the 'Traffic' section by inserting the following descriptions in the correct order on Table 3:

Traffic moving freely, heavy parking

Traffic congested, not moving freely

Clear road with light parking

Traffic moving freely, light parking [1]

(ii) Complete the 'Noise' section of Table 3 by inserting appropriate descriptions. [2]

(iii) What decisions would the students have to make in organising and carrying out the environmental quality survey?

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(c) The students needed to record the results of their environmental quality survey. In Fig. 8, design a sheet which could be used to record their results for one street. [3]

Environmental quality survey

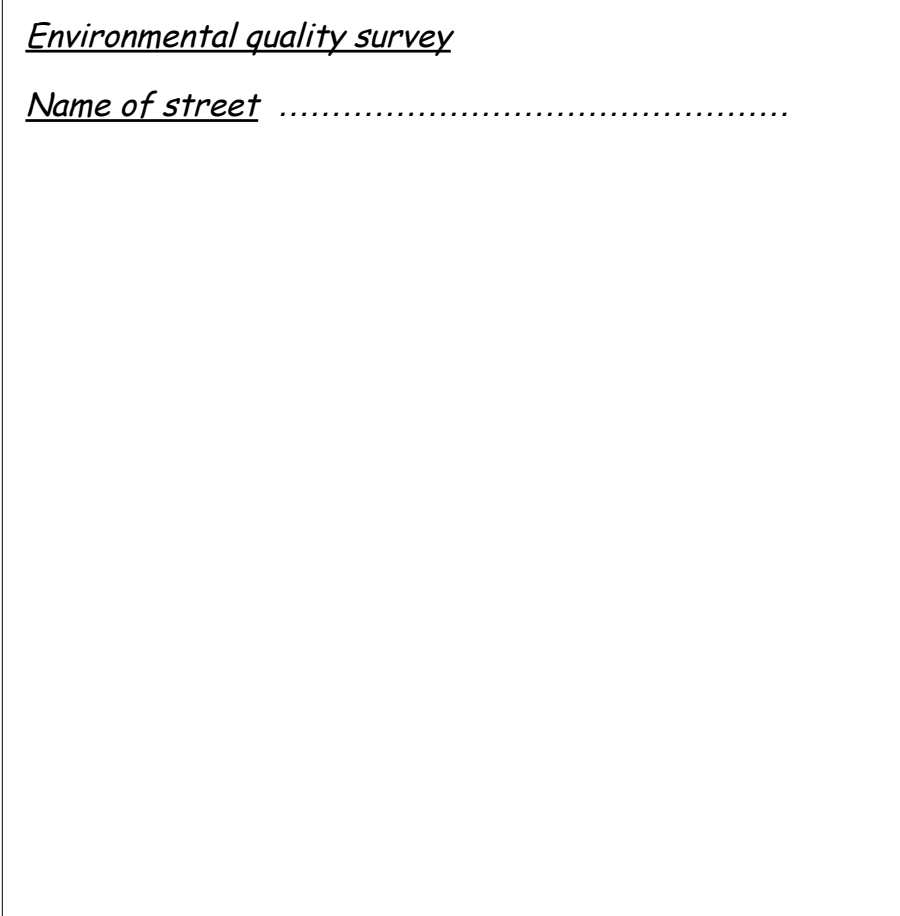*Name of street* ....

Fig. 8

(d) The results of the environmental quality survey are shown in Table 4 (Insert).

(i) Use these results to complete the dispersion graph, Fig. 9 opposite. Plot the environmental quality scores of the residential streets R1 and R4 and circle the median (middle) value for residential land use. [3]
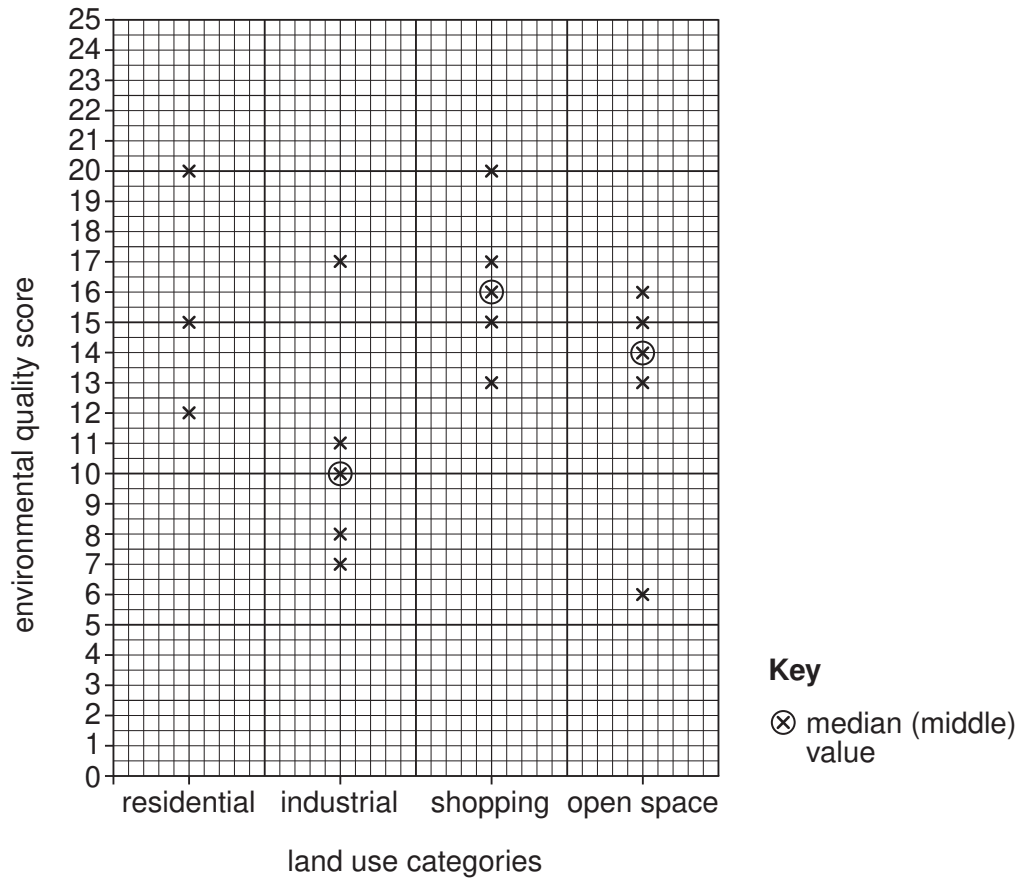
Results of environmental quality survey

Fig. 9

(ii) In the space below, rank the four land use categories in order of their median (middle) score.

Rank	Land use category
High	
↑	
↓	
Low	

[1]

(iii) The students accepted **Hypothesis 1**, that
'*The quality of the environment is affected by the type of land use*'.
Do you agree with them? Support your decision with evidence from Fig. 9.

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(iv) Suggest reasons for the difference in results between the industrial areas and the shopping areas.

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(e) (i) Look again at the results sheet, Table 4 (Insert). Use these results to complete the scatter graph, Fig. 10, by plotting the environmental quality scores of the residential streets R1, R4 and R5. [3]

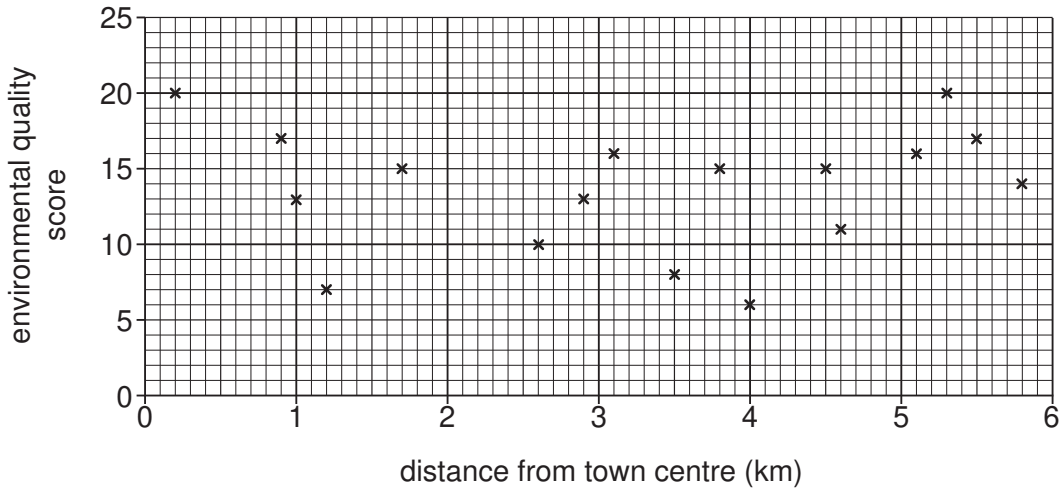**How environmental quality varies with distance
from town centre**

Fig. 10

(ii) Looking at the results shown in Fig. 10, do you accept or reject **Hypothesis 2**, that '*The quality of the environment varies with distance from the town centre*'?
Give evidence for your answer.

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....[2]

(f) Having completed the survey, the students were discussing the methods they had used with their teacher. They identified the following two things that they felt could have been improved:

- The environmental quality reference sheet (Table 3)
- The four land use categories they had identified (residential, industrial, shopping, open space).

What problems do you think the students might have identified about the environmental quality reference sheet and the four land use categories?

The environmental quality reference sheet

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The four land use categories

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....[4]

[Total: 30 marks]

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