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0460/42

May/June 2017

1 hour 30 minutes

Additional Materials: Ruler
Protractor
Calculator

Write your Centre number, candidate number and name in the spaces provided.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO NOT WRITE IN ANY BARCODES.

Write your answer to each question in the space provided.
If additional space is required, you should use the lined pages at the end of this booklet. The question number(s) must be clearly shown.

Answer **all** questions.

The Insert contains Photographs A and B and Table 1 for Question 1, and Figs. 5 and 7 and Tables 4 and 5 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.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **19** printed pages, **1** blank page and **1** Insert.

- 1 Students in Wales went on a field visit to an area of coastal sand dunes near to their school. They had studied the formation of sand dunes and wanted to find out about the amount of marram grass and other vegetation growing on them. Photograph A (Insert) shows the coastal sand dunes they visited. Coastal sand dunes are popular places for people to visit and this may affect the growth of vegetation.

(a) (i) Explain how sand dunes like those shown in Photograph A are formed.

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- (ii) The students used the fieldwork equipment shown in Fig. 1 (below) to measure the changing angle of slope across the sand dunes.

Measuring the changing angle of slope

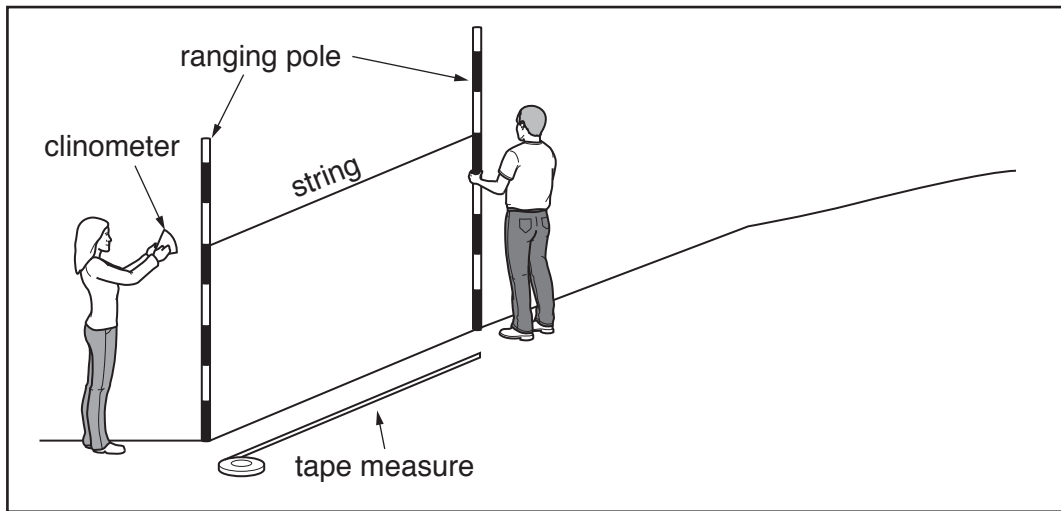


Fig. 1

Explain how the following equipment was used:

Tape measure;

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Ranging poles;

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String;

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Clinometer.

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[4]

- (b) The area the students visited was in a nature reserve where visitors had limited access to some areas. Use the data and the key below to **complete the pie graph**, Fig. 2, which shows visitor access. [2]

access only with permission	13%
no access for visitors	19%

Visitor access to the nature reserve (% of area)

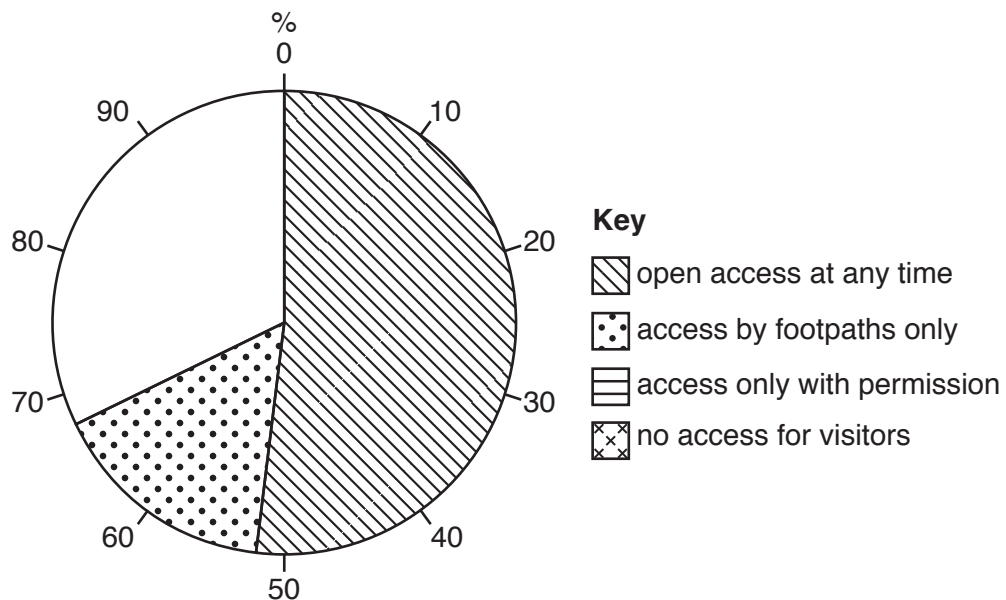


Fig. 2

The students agreed on the following two hypotheses:

Hypothesis 1: *Vegetation cover and the number of plant species are greater in areas with no visitor access.*

Hypothesis 2: *The impact of people on the sand dunes increases away from the beach.*

- (c) Two students were allowed to work in an area where there was usually no visitor access. They used a quadrat to measure the vegetation cover every 10 metres along a transect through the sand dunes. Other students did the same task in an area open to visitors.
- (i) Describe how the students would use a quadrat like the one shown in Photograph B (Insert) to do this fieldwork task.

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- (ii) The results of this task are shown in Table 1 (Insert). Use these results to **plot in Fig. 3A** (below), the percentage of vegetation cover at 20m along the transect. [1]
- (iii) The students also counted the number of different plant species every 10m along both transects. The results of this task are also shown in Table 1 (Insert).

Use these results to **plot in Fig. 3A** (below), the number of species at 20m along the transect. [1]

Results of students' fieldwork

Area with no visitor access

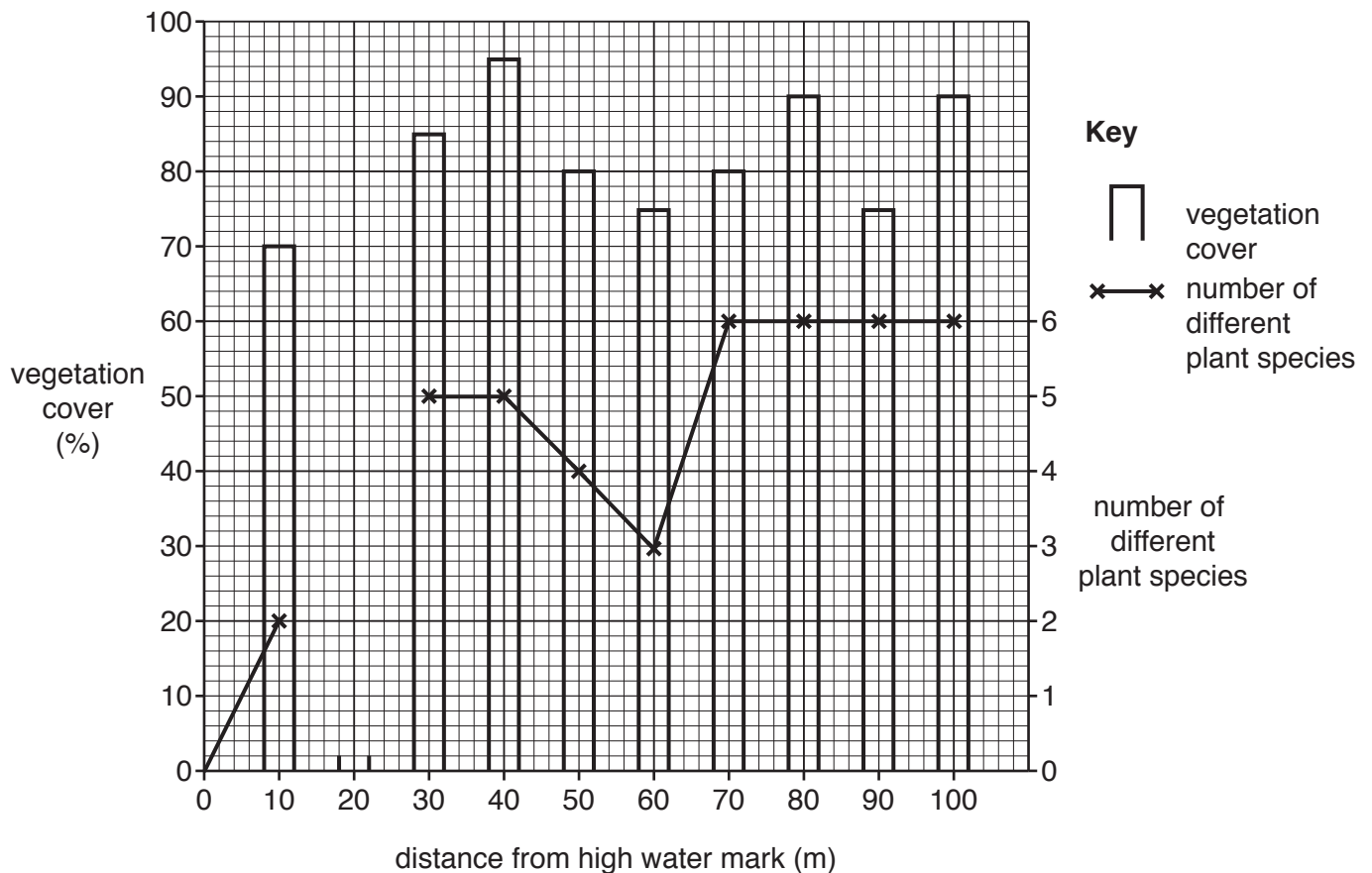


Fig. 3A

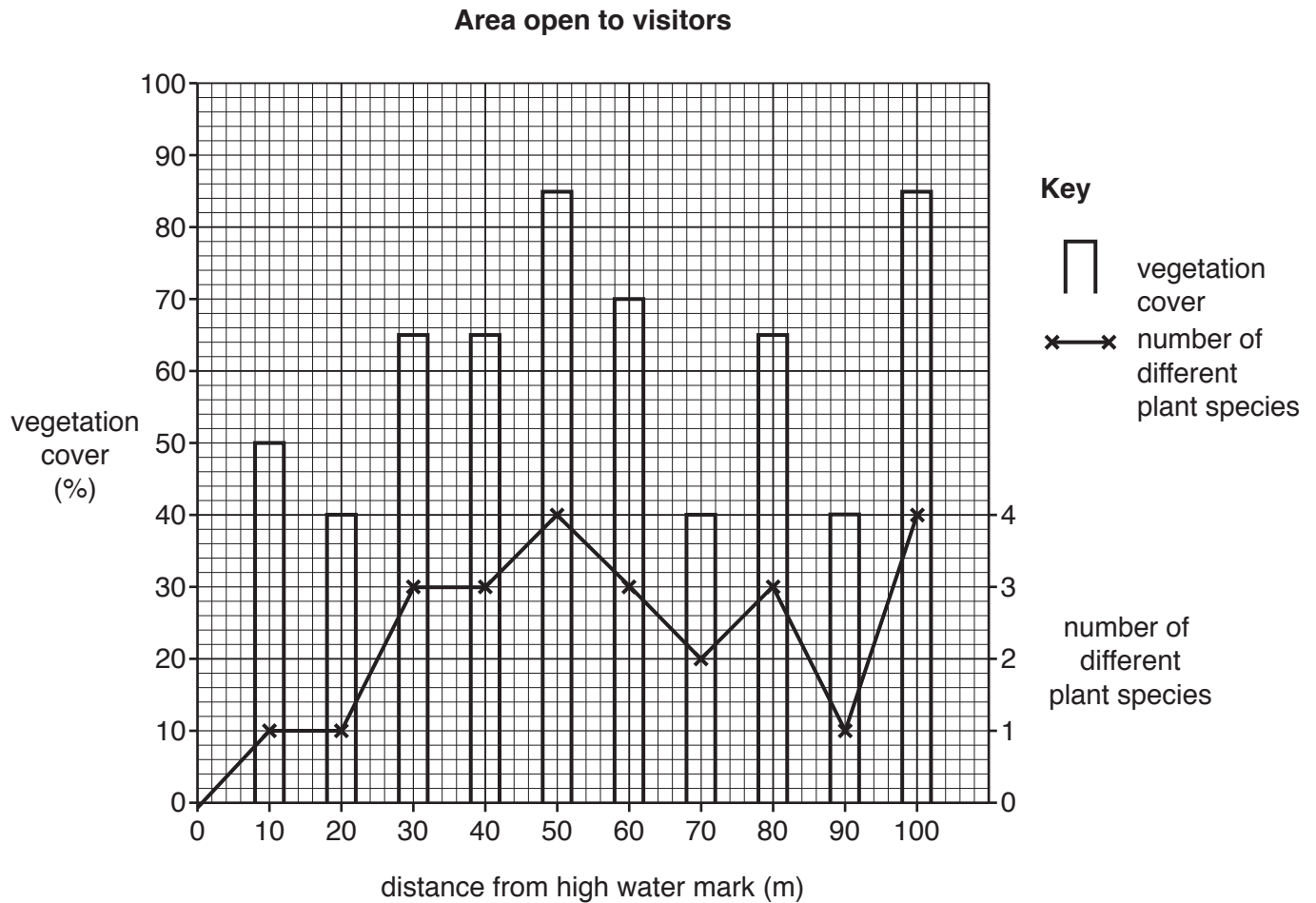


Fig. 3B

- (iv) What conclusion would the students make about **Hypothesis 1**: *Vegetation cover and the number of plant species are greater in areas with no visitor access*? Support your answer with evidence from Table 1 and Figs. 3A and 3B.

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[4]

- (d) To investigate **Hypothesis 2**: *The impact of people on the sand dunes increases away from the beach*, the students decided to do a bi-polar survey at three sites in the dunes where visitors were allowed access. A bi-polar survey is a rating system used to measure the impact of people on the sand dunes. They agreed the following plan for the surveys.

Location of survey	Time of survey
Group A at site A – 2 m inland from the beach	Monday morning 09:00
Group B at site B – 50 m inland from the beach	Friday evening at 17:00
Group C at site C – 100 m inland from the beach	Sunday afternoon at 14:00

- (i) Give **two** reasons why their teacher suggested that this plan might produce unreliable results.

1

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2

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[2]

- (ii) The results of the bi-polar survey for each group are shown in Table 2 (below).
Complete Table 2 by inserting the scores and calculating the total score at site B. [1]

Table 2

Results of the bi-polar survey

Site A (2m inland from the beach)

Negative features	-2	-1	0	+1	+2	Positive features	Score
Lots of car tracks			✓			No car tracks	0
Noisy	✓					Quiet	-2
Lots of litter	✓					No litter	-2
Lots of footpath erosion	✓					No footpath erosion	-2
Burnt vegetation		✓				No burnt vegetation	-1
Total environmental score							-7

Site B (50m inland from the beach)

Negative features	-2	-1	0	+1	+2	Positive features	Score
Lots of car tracks				✓		No car tracks	
Noisy				✓		Quiet	
Lots of litter	✓					No litter	
Lots of footpath erosion		✓				No footpath erosion	
Burnt vegetation				✓		No burnt vegetation	
Total environmental score							

Site C (100m inland from the beach)

Negative features	-2	-1	0	+1	+2	Positive features	Score
Lots of car tracks					✓	No car tracks	+2
Noisy					✓	Quiet	+2
Lots of litter				✓		No litter	+1
Lots of footpath erosion				✓		No footpath erosion	+1
Burnt vegetation					✓	No burnt vegetation	+2
Total environmental score							+8

- (iii) Use the results in Table 2 to complete the results of the bi-polar survey at site B in Fig. 4 (below). [2]

Results of bi-polar survey

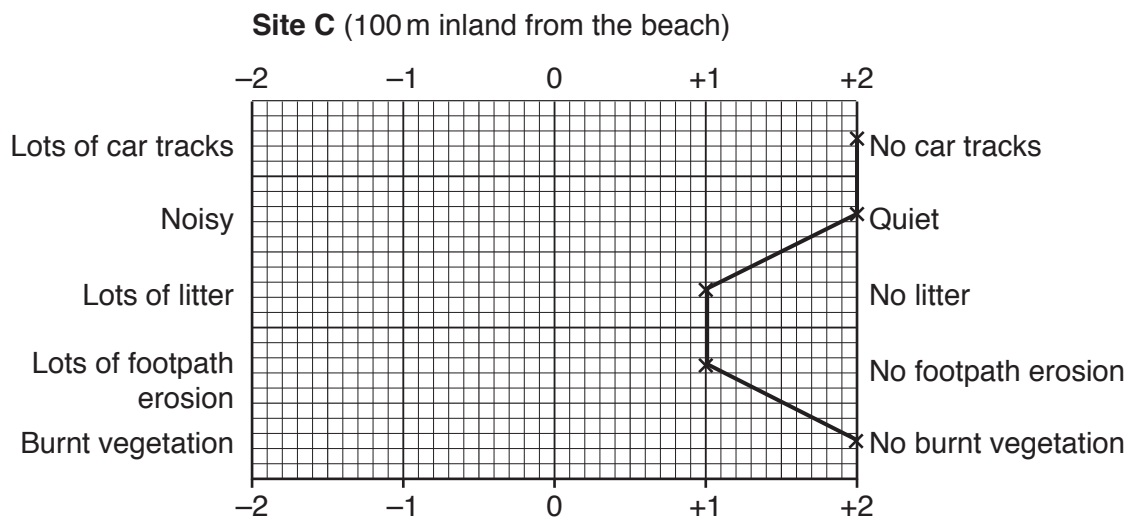
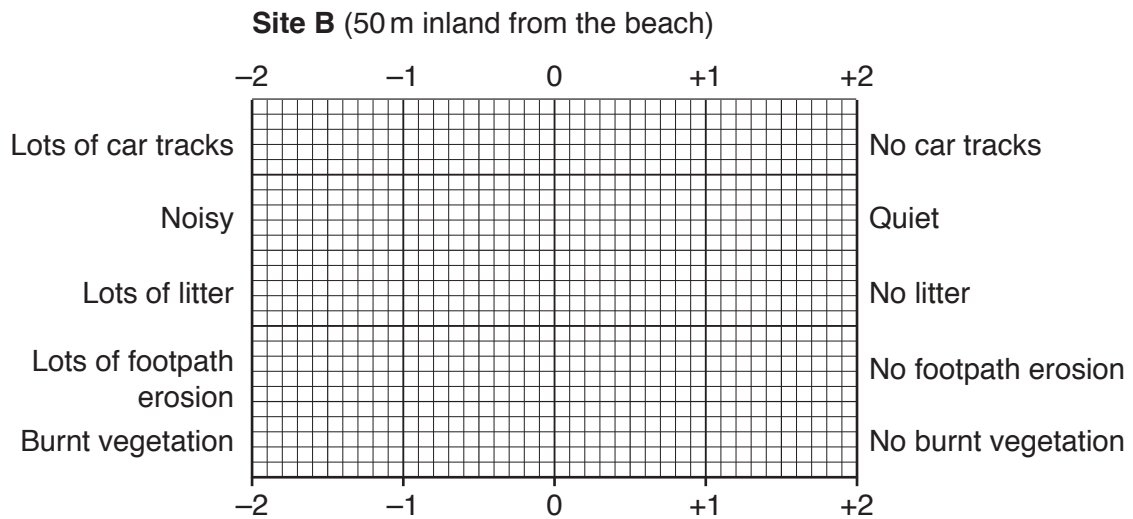
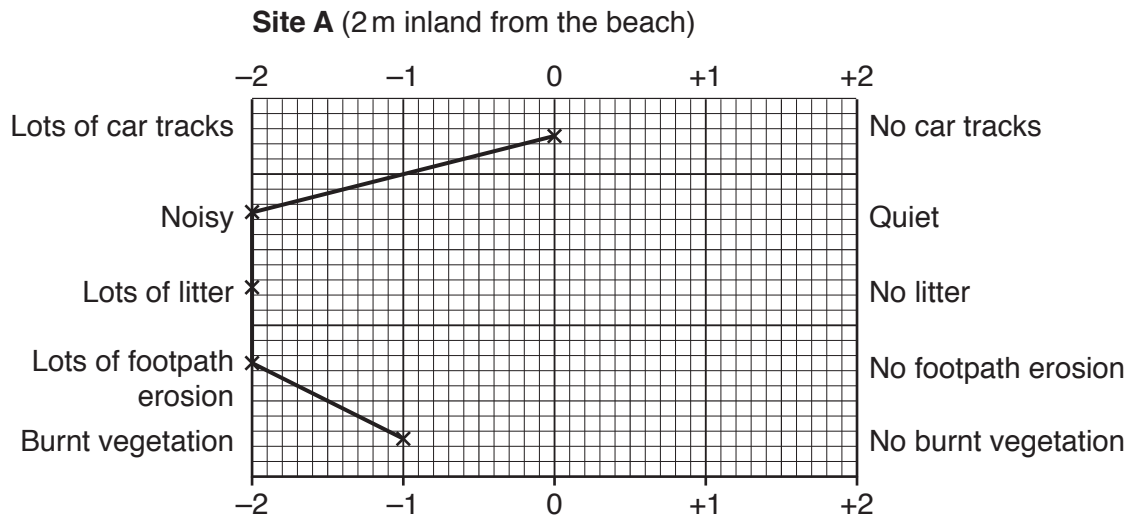


Fig. 4

- (iv) Do the results of the bi-polar survey in Table 2 and Fig. 4 support **Hypothesis 2: *The impact of people on the sand dunes increases away from the beach?*** Support your conclusion with evidence.

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- (e) Fig. 2 shows that visitors are allowed access at any time to more than half of the area of sand dunes.

Suggest how the sand dunes and vegetation in this area can be protected from visitors.

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[Total: 30 marks]

- 2 Members of a water charity were doing research into the water supply in six rural villages in India before beginning a water improvement scheme.

(a) The water charity published information about differences in water access and use in different parts of the world.

- (i) Fig. 5 (Insert) shows the world distribution of people with no access to clean water. Use the data on Fig. 5 to **complete the table** below which ranks the different areas. [2]

Number of people with no access to clean water	Areas of the world
Most people  Least people	
	More economically developed areas in North America, Europe, Asia and Australasia

- (ii) Fig. 6 (opposite) compares one resident's daily use of water in Delhi, the capital city of India, and one resident's daily use in one of the rural villages where research was being done. Use the data in Table 3 (below) to **complete** the Delhi resident's use of water in Fig. 6 (opposite). [3]

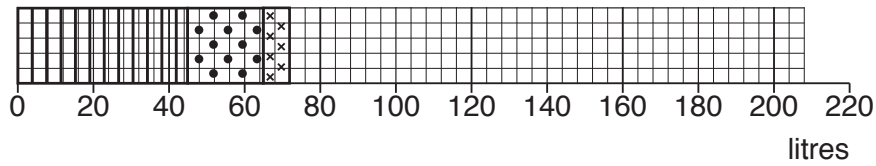
Table 3

Delhi resident's use of water

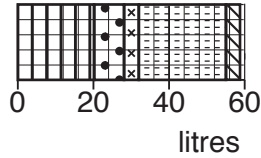
Activity	Amount of water (litres) used in one day by resident of Delhi
Flushing the toilet	45
Having a shower	20
Preparing food and drinks	7
Using the dishwasher	28
Using the washing machine / washing clothes	102
Washing	6

Amount of water used in one day

Resident in Delhi



Resident in a village



Key

Uses of water



flushing the toilet



having a shower



preparing food and drinks



using the dishwasher



using the washing machine / washing clothes



washing

Fig. 6

- (iii) Using Fig. 6 and Table 3, identify **two main** differences between the use of water by the residents in Delhi and in the village.

1

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2

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[2]

The researchers wanted to find out if the following hypotheses were correct:

Hypothesis 1: *There is a positive relationship between the average time spent by villagers collecting water and the average distance they travel to collect it.*

Hypothesis 2: *There is a positive relationship between the average time spent by villagers collecting water and the average amount of water used per family.*

- (b) To investigate the two hypotheses the researchers used a questionnaire with residents of 20 houses in each village. The questionnaire is shown in Fig. 7 (Insert).

- (i) Describe an appropriate method to choose a fair sample of 20 houses in each village.

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- (ii) Suggest **two** practical difficulties for the researchers of collecting data using a questionnaire.

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[2]

(c) The results of Questions 1, 2 and 3 in the questionnaire are shown in Table 4 (Insert).

(i) Fig. 8 (below) shows distance travelled and time spent collecting water. Use the results in Table 4 to **plot the data** for Bacharna in Fig. 8. [1]

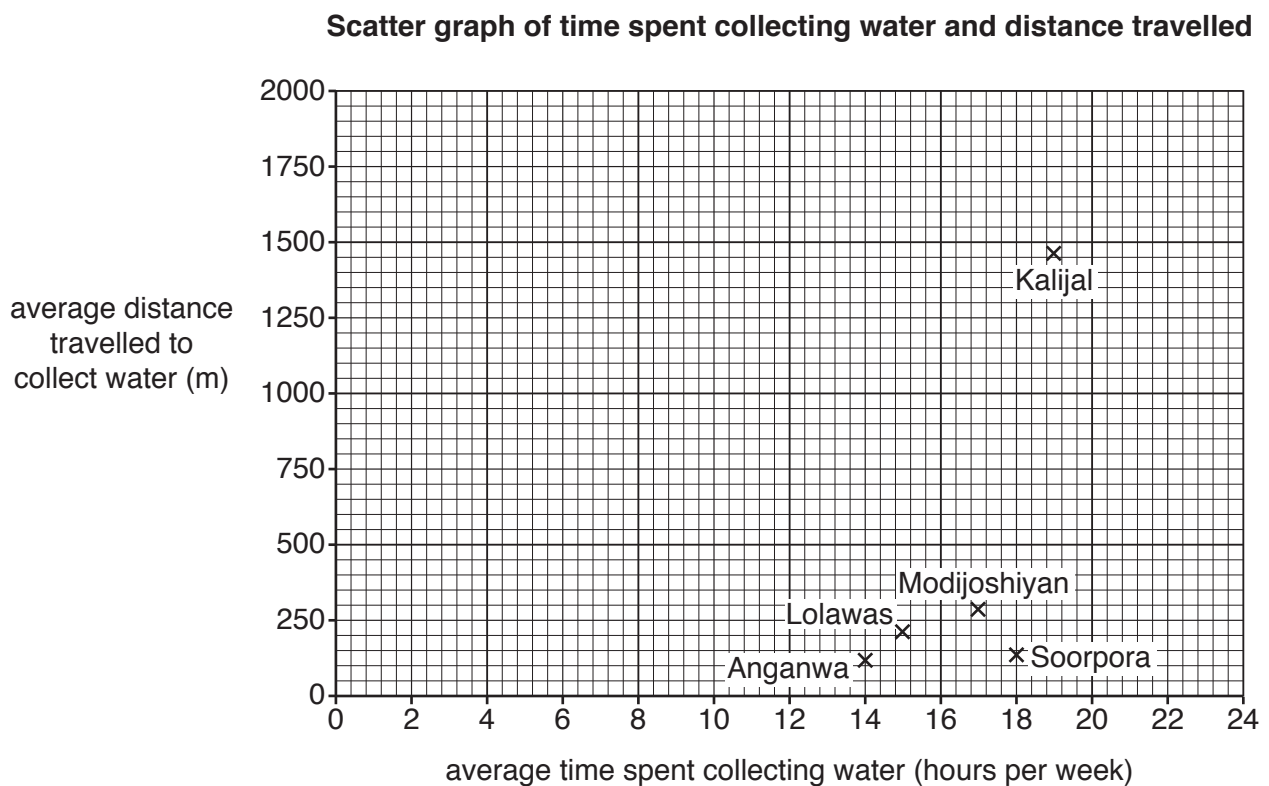


Fig. 8

(ii) The researchers made the conclusion that **Hypothesis 1: *There is a positive relationship between the average time spent by villagers collecting water and the average distance they travel to collect it*** was partly true. What evidence in Table 4 and Fig. 8 supports this conclusion?

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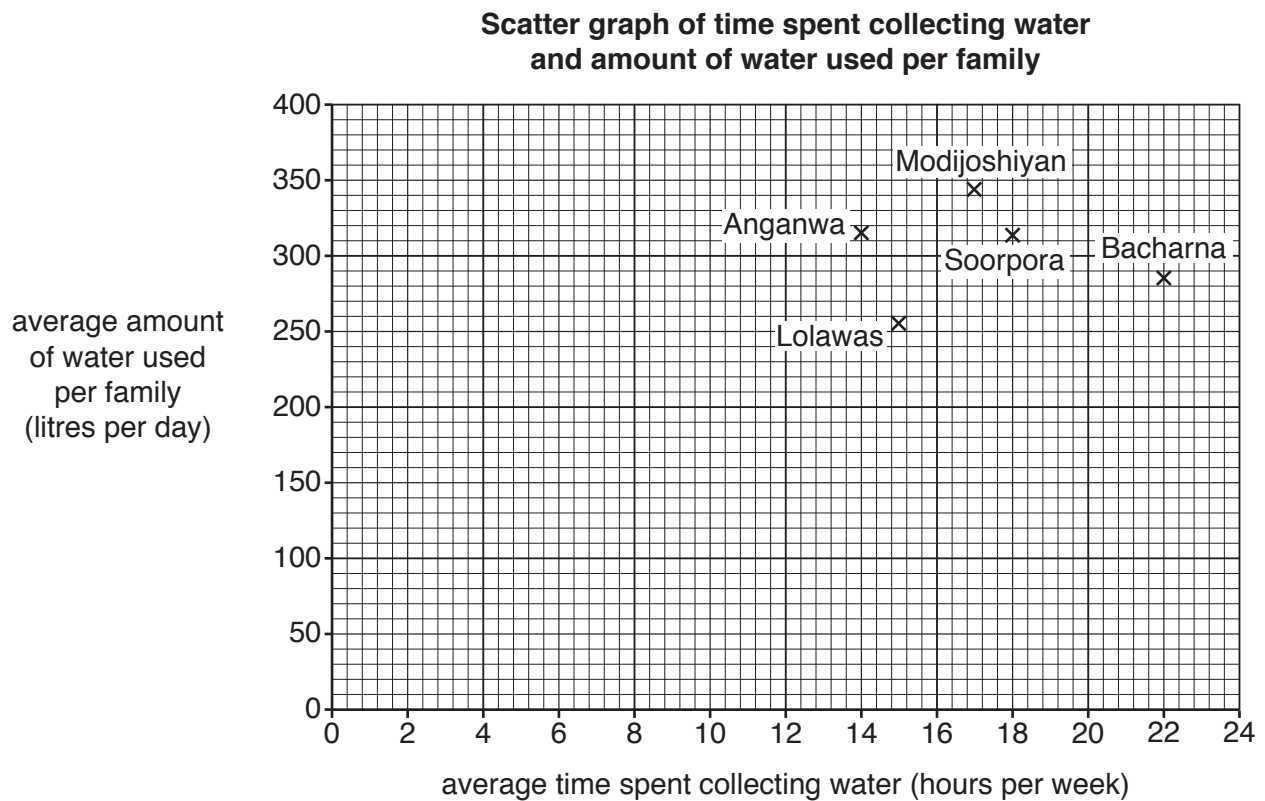


Fig. 9

- (iv) What conclusion would the researchers make about **Hypothesis 2: *There is a positive relationship between the average time spent by villagers collecting water and the average amount of water used per family.*** Support your decision with evidence from Table 4 and Fig. 9.

.....[4]

(d) The results of Question 4 in the questionnaire are shown in Table 5 (Insert).

(i) In which village did **all** families get some of their water from wells?

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[1]

(ii) In which village did families get their water from the greatest variety of sources?

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[1]

(iii) Suggest reasons why families in Soorpora obtained their water from different sources than families in Bacharna.

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(iv) As well as having to travel long distances or taking a long time to collect water, suggest other problems with the water supply in villages like Bacharna and Kalijal.

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[Total: 30 marks]

[illegible]

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