Cambridge Assessment International Education

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CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

7421395787

GEOGRAPHY **0460/42**

Paper 4 Alternative to Coursework **February/March 2023**

1 hour 30 minutes

You must answer on the question paper.

You will need: Insert (enclosed) Ruler
Calculator
Protractor

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- If additional space is needed, you should use the lined pages at the end of this booklet; the question number or numbers must be clearly shown.

INFORMATION

- The total mark for this paper is 60.
- The number of marks for each question or part question is shown in brackets [ ].
- The insert contains additional resources referred to in the questions.

This document has **16** pages.

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1 Some students in Canada did fieldwork to compare different areas of a local town. They divided their investigation into two parts. First, they investigated what people who lived in the different areas thought about their quality of life, and second, they looked at the environment of different areas.

Quality of life is a measurement of a person's well-being and satisfaction (happiness) which could include things such as safety, community spirit and level of crime.

The students chose four fieldwork sites in different areas of the town. These are shown in Fig. 1.1 (Insert).

They decided to investigate the following hypotheses:

Hypothesis 1: *The quality of life of residents improves as distance from the town centre increases.*

Hypothesis 2: *The quality of the environment improves as distance from the town centre increases.*

(a) To investigate **Hypothesis 1:** *The quality of life of residents improves as distance from the town centre increases*, the students asked residents in each area to complete the questionnaire which is shown in Fig. 1.2 (Insert).

Name and describe **one** sampling method the students could use to select 25 people in each area to take part in their survey.

Name of sampling method: .....

Description of how the students would use this sampling method:

.....

.....

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.....

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..... [3]

(b) (i) The answers for question 1: *How safe do you feel in the local area?* are shown in Table 1.1 (Insert). Use these results to **complete the pie graph for area D** in Fig. 1.3. [2]

Answers to question 1: How safe do you feel in the local area?

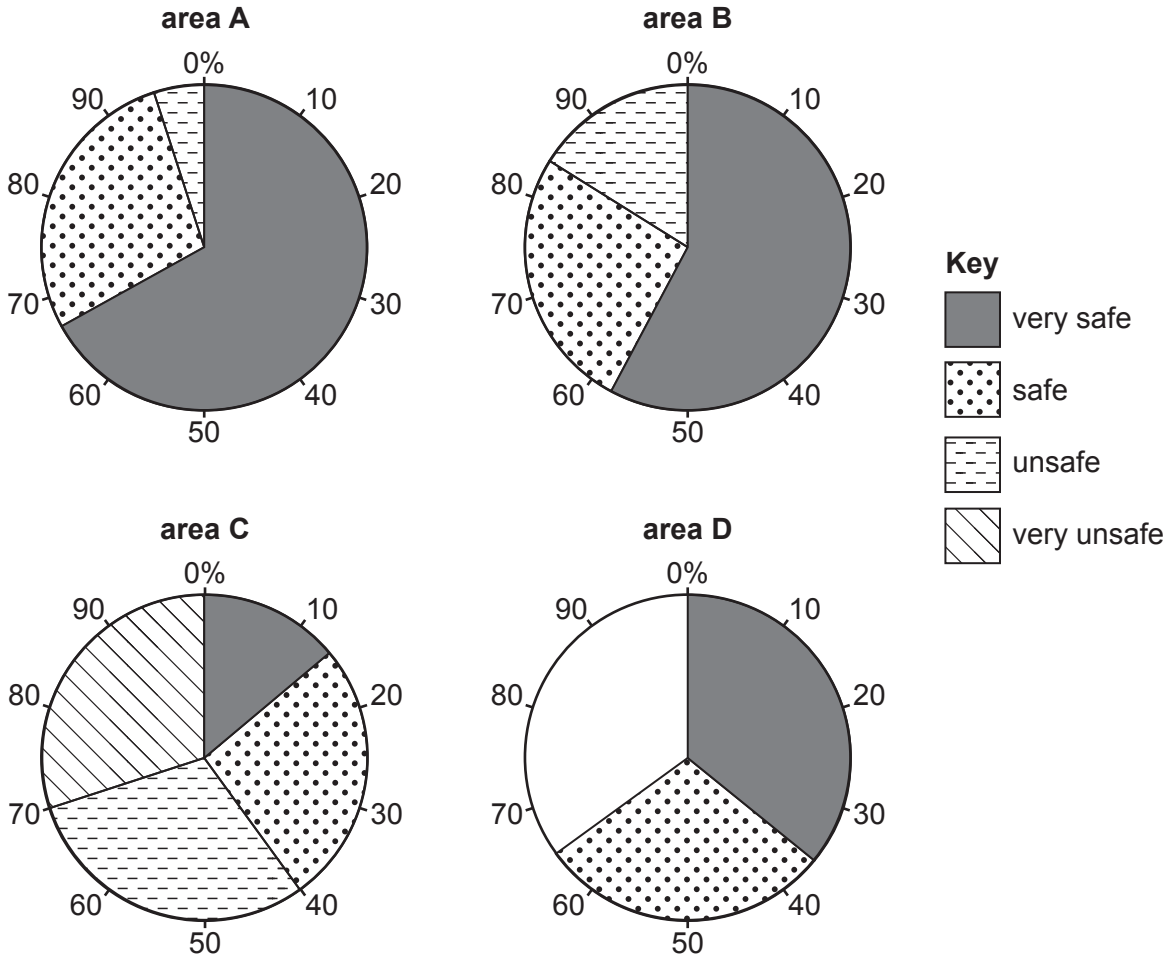


Fig. 1.3

(ii) The answers for question 2: *Which **one** of the following best describes the community in the local area?* are shown in Fig. 1.4. Use the results in Table 1.2 (Insert) to **complete the graph for area C** in Fig. 1.4. [2]

Answers to question 2: Which one of the following best describes the community in the local area?

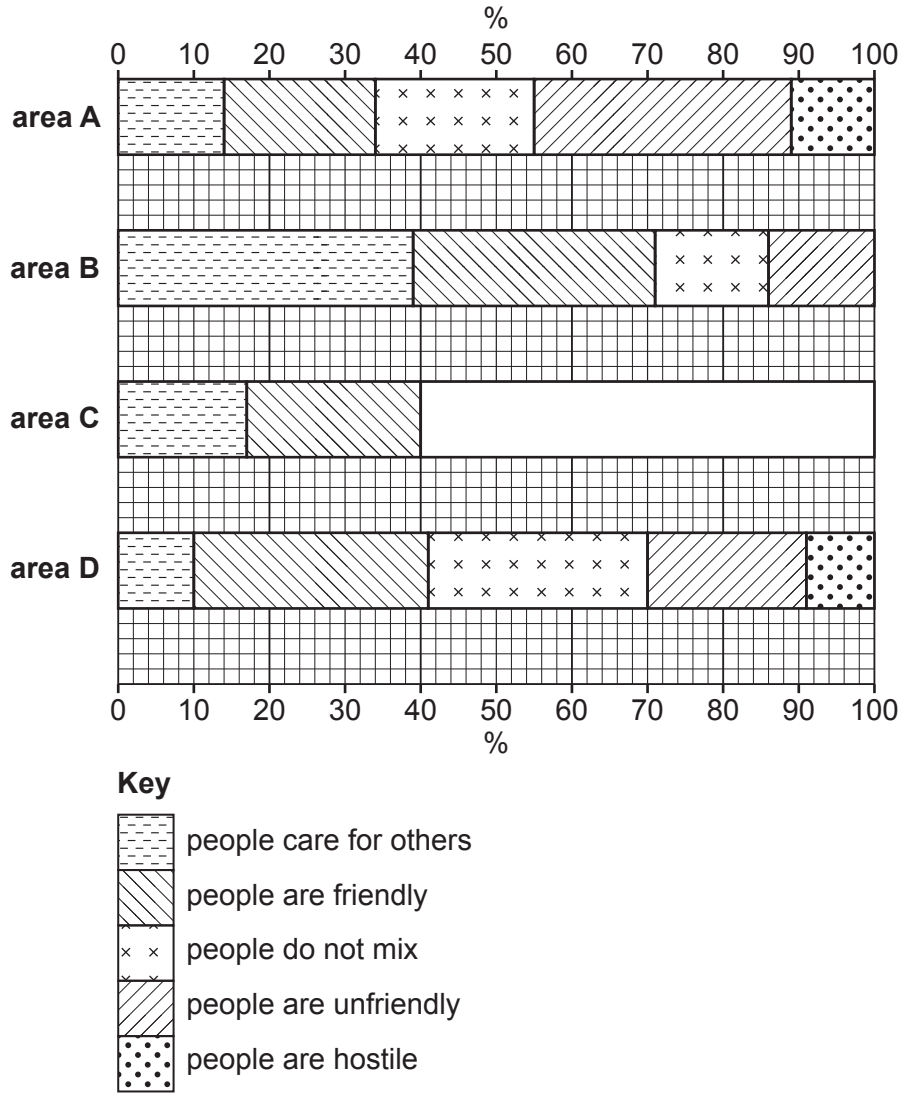


Fig. 1.4

(iii) The answers for question 3: *Which of the following crimes have you been a victim of?* are shown in Table 1.3 (Insert).

Use the results of the questionnaire to identify in which of the four areas residents

feel safest (Table 1.1) area .....

think they have the best community (Table 1.2) area .....

have been the victim of least crime (Table 1.3) area .....

[3]

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(iv) The students decided that **Hypothesis 1:** *The quality of life of residents improves as distance from the town centre increases* was **false**.

Support this conclusion with **one** piece of evidence from each of Fig. 1.3 or Table 1.1, Fig. 1.4 or Table 1.2, and Table 1.3.

Fig. 1.3/Table 1.1

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Fig. 1.4/Table 1.2

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Table 1.3

.....

.....

[3]

(c) To investigate **Hypothesis 2:** *The quality of the environment improves as distance from the town centre increases*, each student did an environmental quality survey in the four areas. To make their survey more reliable, the students produced brief descriptions of each score. The scores went from 4 (highest) to 1 (lowest). An example for public open space is shown below.

category:	**description**	**score**
public open space	well-kept vegetation which is regularly maintained	4
	vegetation is maintained but not to a high level	3
	vegetation is not maintained and is overgrown	2
	very little vegetation, land is derelict	1

(i) Put the following descriptions of traffic into the correct order by writing the letters W to Z in the table below. [1]

W lots of traffic which is moving slowly
Y little traffic which is moving steadily
X lots of traffic which is causing congestion and queues
Z very little traffic which is moving freely

category:	**letter**	**score**
traffic		4
		3
		2
		1

(ii) The students went as a group with their teacher to do a practice survey in an area near their school. The scores given by two students are shown in Table 1.4.

Table 1.4

Students' scores

category	student A	student B
building condition	4	2
public open space	3	2
traffic	3	1
noise	4	2

Suggest **two** reasons why the students gave different scores.

1 .....

.....

2 .....

..... [2]

(iii) Describe how the students did the environmental quality survey.

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..... [4]

(d) One student's results of the environmental quality survey are shown in Table 1.5 (Insert).

(i) **Plot the results** for area B in Fig. 1.5. [2]

Student's results of environmental quality survey

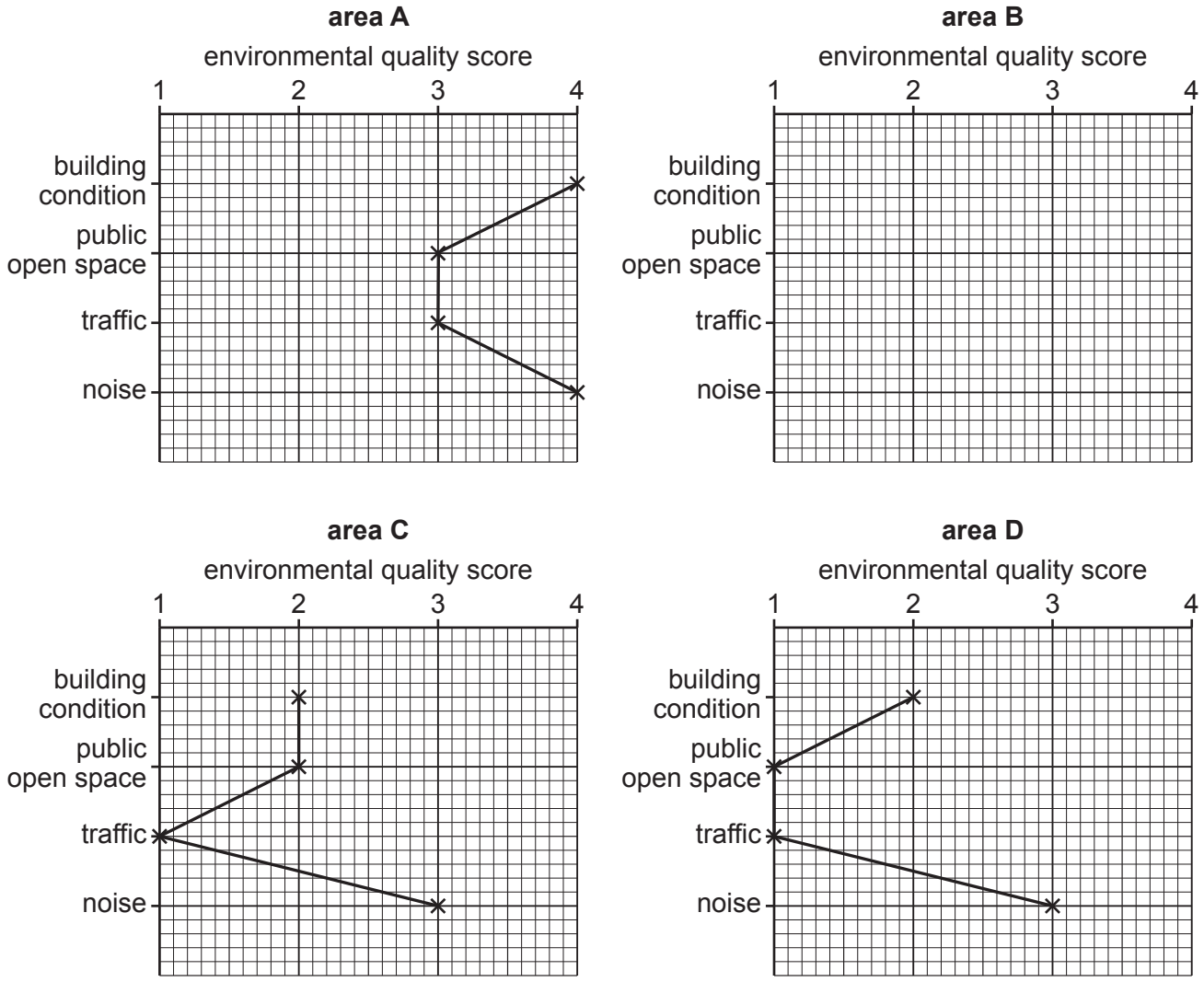


Fig. 1.5

(ii) The student also calculated the total environmental quality score for each area. Use these results from Table 1.5 (Insert) to **draw the bar** for area C in Fig. 1.6. [1]

Total environmental quality scores

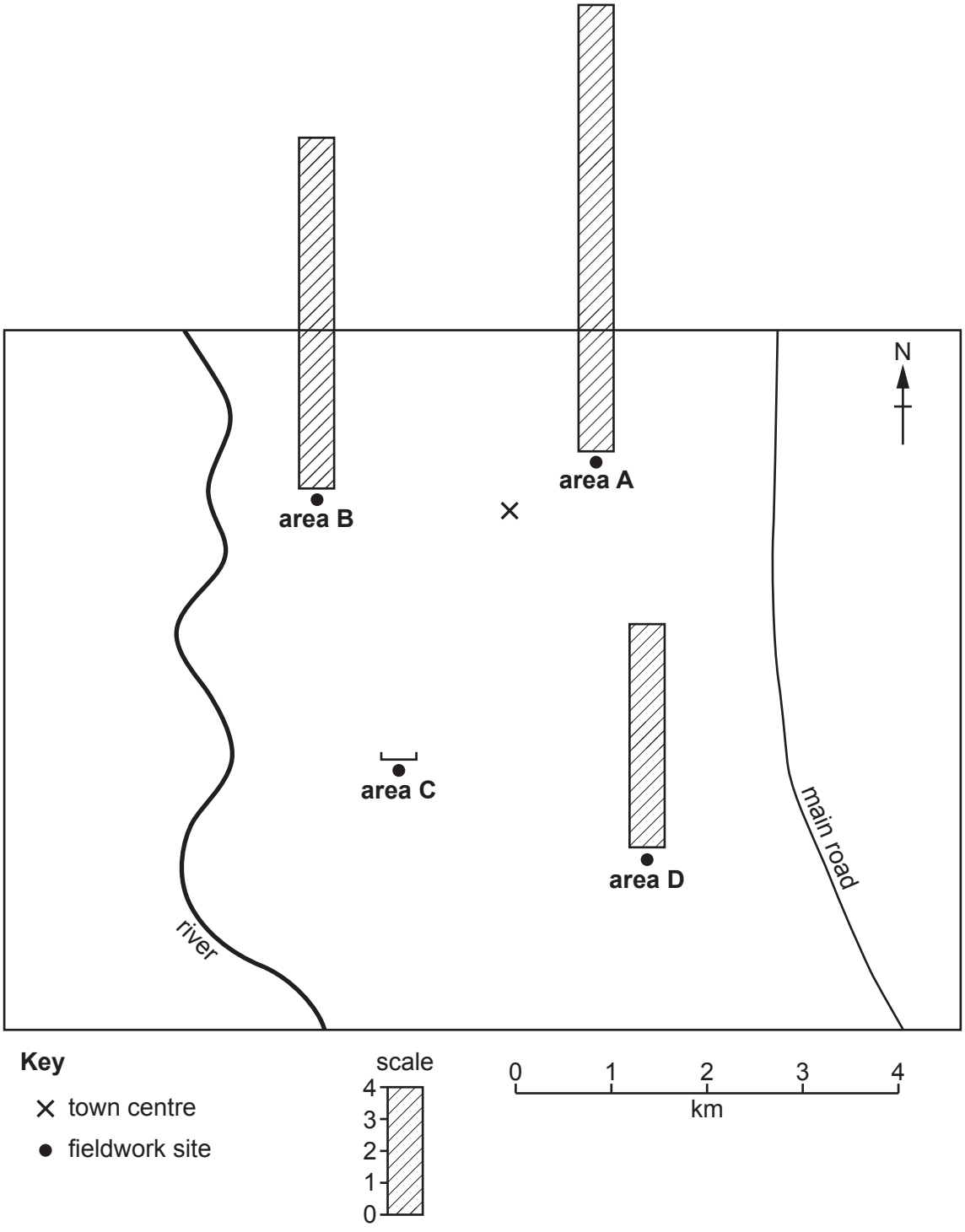


Fig. 1.6

(iii) Which **one** of the following conclusions to **Hypothesis 2:** *The quality of the environment improves as distance from the town centre increases* is correct? **Circle your answer below** and support your decision with evidence from Figs. 1.5 and 1.6 and Table 1.5.

hypothesis is true **hypothesis is partly true** **hypothesis is false**

Evidence

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..... [3]

(e) For extension work the students wanted to investigate how the amount of traffic might vary between the different areas of the town. Describe a fieldwork method for this investigation.

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..... [4]

[Total: 30]

2 Students in Norfolk, UK, read a newspaper report about water pollution in a local river. They decided to do some fieldwork to investigate this. However, before they started their fieldwork their teacher warned them about the possible dangers of working in the river. She also suggested some precautions the students might take to protect themselves.

(a) (i) Suggest **two** possible dangers which their teacher may have warned them about when doing fieldwork in the river and suggest different precautions that the students might take to protect themselves.

possible danger	student precaution
1	1 ....
2	2 ....

[4]

(ii) First the students did a visual survey of the river. Suggest **two** ways that they would be able to see from the river bank if the river was polluted.

1 .....

.....

2 .....

.....

[2]

(b) The students investigated two hypotheses.

Hypothesis 1: *The level of water pollution increases downstream*.

Hypothesis 2: *Animal species which live in the river change downstream*.

To find out the level of water pollution, the students chose five sites along the river to measure pH and oxygen levels and how clear the water was.

- pH is a measure of the acidity of water. The pH score decreases as water becomes more acidic. More acidic water means that pollution is more likely.
- The oxygen level of water decreases as it becomes more polluted.
- Water clarity decreases as it becomes more polluted.

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The students used digital measuring equipment to measure the pH and oxygen levels. Fig. 2.1 (Insert) shows a pH meter being used in a river.

(i) Suggest **two** advantages of using digital measuring equipment as shown in Fig. 2.1.

1 .....

.....

2 .....

.....

[2]

(ii) Describe **two** ways that the students could make sure that their measurements were reliable.

1 .....

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2 .....

.....

[2]

One student's fieldwork results are shown in Table 2.1 (Insert).

(iii) **Plot the pH score** of the water at site 3 on Fig. 2.2. [1]

pH score at the five sites

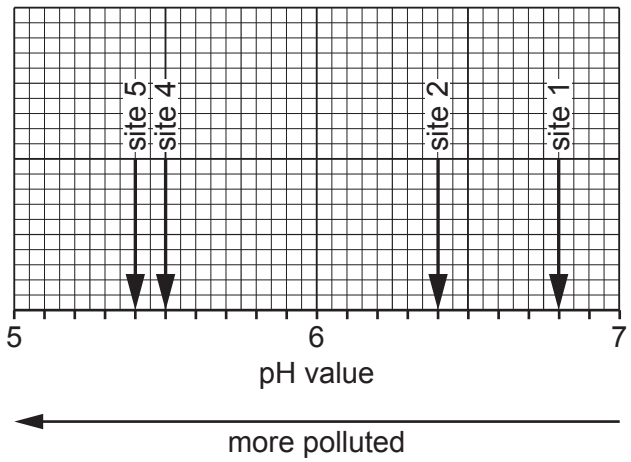


Fig. 2.2

(iv) **Plot the oxygen level** of the water at site 5 on Fig. 2.3. [1]

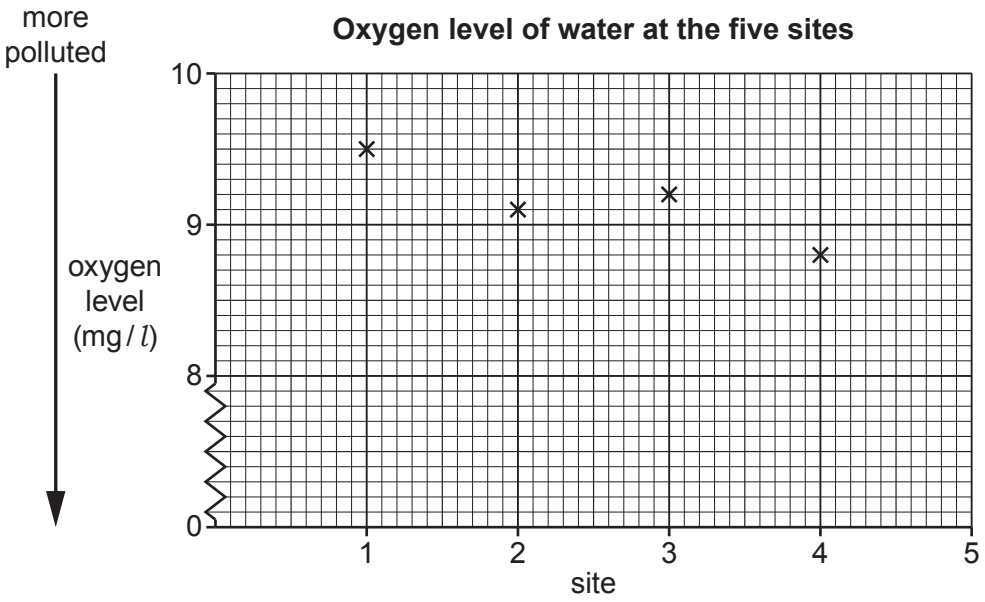


Fig. 2.3

(c) The student's method of measuring how clear the water was at each site is shown in Fig. 2.4 (Insert).

(i) Suggest why this fieldwork method may be unreliable.

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.....

..... [2]

(ii) The student's measurements are shown in Table 2.1 (Insert). **Plot the measurement** at site 3 on Fig. 2.5 below. [1]

Depth of water where disc cannot be seen at the five sites

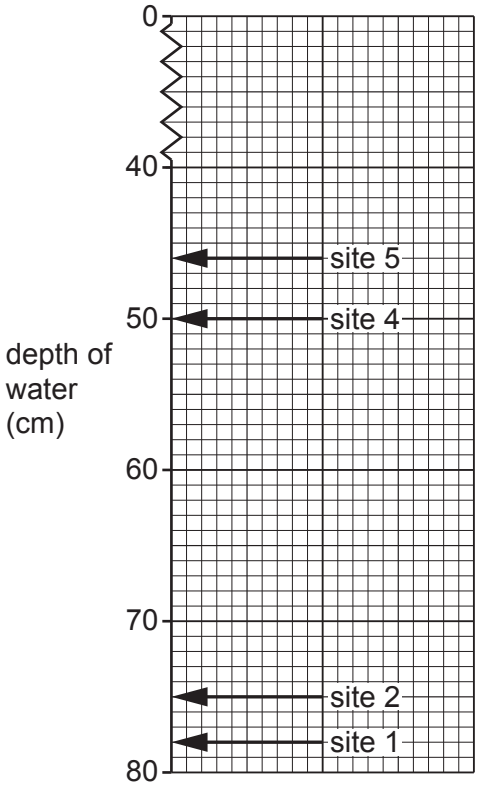


Fig. 2.5

(iii) Do the results shown in Figs. 2.2, 2.3 and 2.5 and Table 2.1 support **Hypothesis 1:** *The level of water pollution increases downstream*?
Use data to support your conclusion.

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..... [4]

(iv) Suggest how each of the following may cause pollution in the river.

The river flows through a countryside area where there are many visitors.

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.....

The river flows past factories where raw materials are processed.

.....

.....
[2]

(d) To investigate **Hypothesis 2:** *Animal species which live in the river change downstream*, the students searched for the animal species which live on the river bed. They did this by disturbing the bed and catching the wildlife in a net.

The results of their investigation are shown in the tally chart, Fig. 2.6.

Students' results

		quality of water: unpolluted ◄ ► very polluted							
		animal species found							
site	**distance downstream (km)**	stonefly *	dobsonfly *	caddisfly *	mayfly *	midge fly *	snail	leech	worm
1	5	///	//	//					
2	11	//	/	//	/	/			
3	18		//	/	//	//			
4	21								
5	25					//	//	/	//

* larvae of these species

Fig. 2.6

(i) Use the data from Table 2.2 to **complete the results** at site 4 on Fig. 2.6. [1]

Table 2.2

Animal species found at site 4

type of animal species	number found
caddisfly	2
mayfly	1
midge fly	3
snail	1

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(ii) The students made the conclusion that **Hypothesis 2:** *Animal species which live in the river change downstream* was **correct**. What evidence from Fig. 2.6 supports their conclusion?

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..... [2]

(iii) Using Fig. 2.6 **only**, suggest why the animal species live at different sites downstream.

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..... [1]

(e) (i) Suggest a different hypothesis that students could test through river fieldwork. Do **not** refer to water pollution or wildlife in the river.

Hypothesis

.....

..... [1]

(ii) Describe how they could test the hypothesis through fieldwork.

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..... [4]

[Total: 30]

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Additional page

If you use the following page to complete the answer to any question, the question number must be clearly shown.

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