Cambridge Assessment International Education

# Cambridge O Level

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| CANDIDATE NAME | | | | | | | | | |
| CENTRE NUMBER | | | | | | CANDIDATE NUMBER | | | | |

*8255002069*

**GEOGRAPHY** **2217/32**

Paper 3 Geographical Investigations **October/November 2021**

**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 **20** pages. Any blank pages are indicated.

**1** Students in Malta, an island in the Mediterranean Sea, were studying tourism. Tourism is an important industry in Malta and earns a lot of foreign income.

**(a)** Fig. 1.1 (Insert) shows the number of international tourists who visited Malta between 2008 and 2018.

**(i)** In which year was the highest number of tourists measured at 250 000?

..... [1]

**(ii)** Which **one** of the following is the correct description of tourist numbers between 2008 and 2018? Tick (✓) your answer.

| | **tick (✓)** |
|---|---|
| The number of tourists decreases. | |
| The number of tourists increases. | |
| The number of tourists does not change. | |

[1]

**(b)** Fig. 1.2 (Insert) shows the variation in total number of days tourists stayed in Malta during 2017.

**(i)** Describe the variation during the year. Use statistics in your answer.

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..... [3]

**(ii)** Suggest **two** reasons why the number of international tourists visiting Malta varies during the year.

1 .....

.....

2 .....

..... [2]

The students decided to test the following hypotheses:

**Hypothesis 1:** *More tourists to Malta come from the UK than from any other country.*

**Hypothesis 2:** *Tourists from different countries visit Malta for different reasons.*

**(c)** To investigate their hypotheses the students produced a questionnaire. This is shown in Fig. 1.3 (Insert).

Name a sampling method which the students could have used to get their answers to the questionnaire.

.....

Describe this sampling method.

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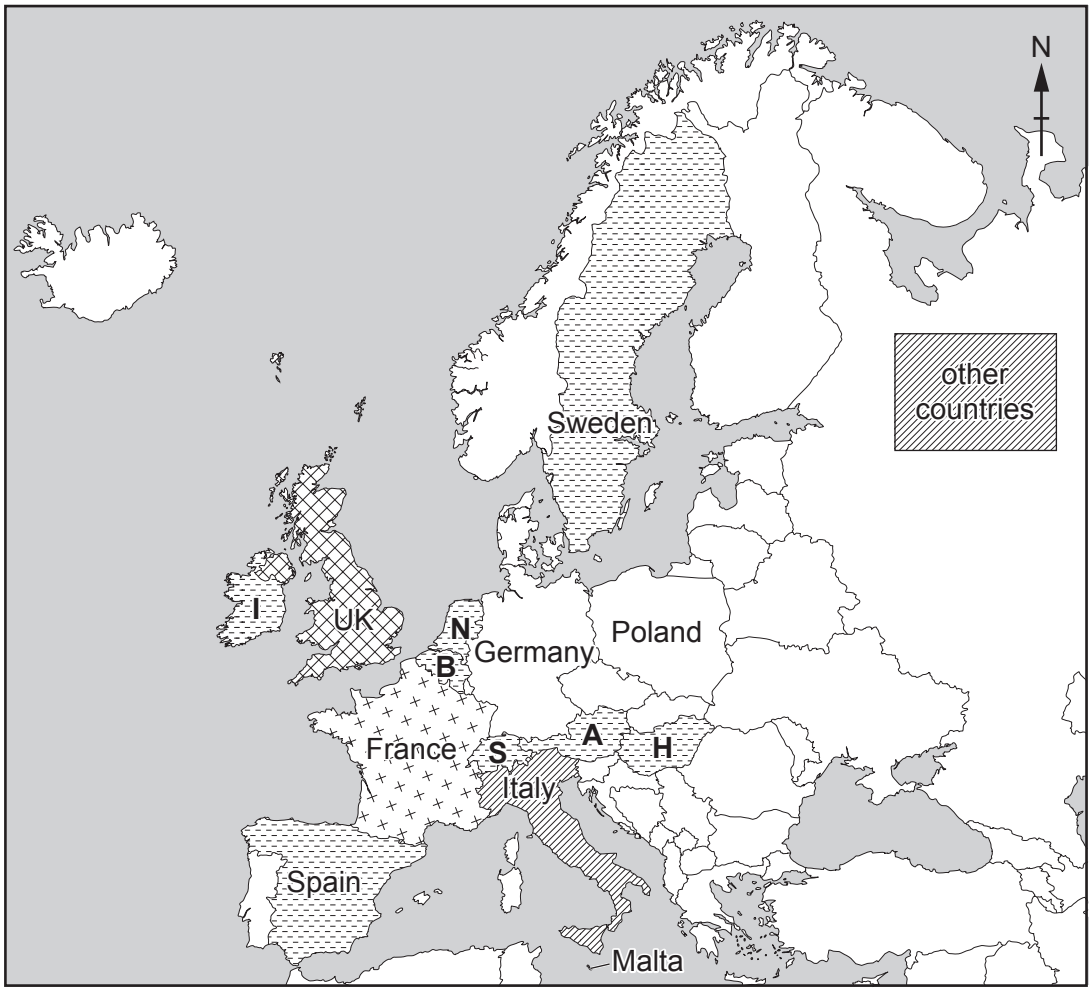
..... [3]

**(d)** The results of Question 2 *(Which country have you come from?)* are shown in Table 1.1 (Insert).

**(i) Plot the data for Germany and Poland** on Fig. 1.4 below. [2]

**Countries that tourists to Malta come from**




**Key**

| | | number of visitors |
|---|---|---|
| **A** | Austria | more than 40 |
| **B** | Belgium | 31 – 40 |
| **H** | Hungary | 21 – 30 |
| **I** | Ireland | 11 – 20 |
| **N** | Netherlands | 1 – 10 |
| **S** | Switzerland | |

0 1000
km

**Fig. 1.4**

**(ii)** What conclusion would the students make to **Hypothesis 1:** *More tourists to Malta come from the UK than from any other country*? Support your decision with evidence from Fig. 1.4 and Table 1.1.

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..... [3]

**(e)** To investigate **Hypothesis 2** students used their answers to Question 3 *(What is the main reason for your visit to Malta?)* for the four countries from which most tourists came. These results are shown in Table 1.2 (Insert).

**(i)** Use the data in Table 1.2 to **complete the pie graph** for the UK in Fig. 1.5 below. [3]

**Answers to Question 3 (What is the main reason for your visit to Malta?)**

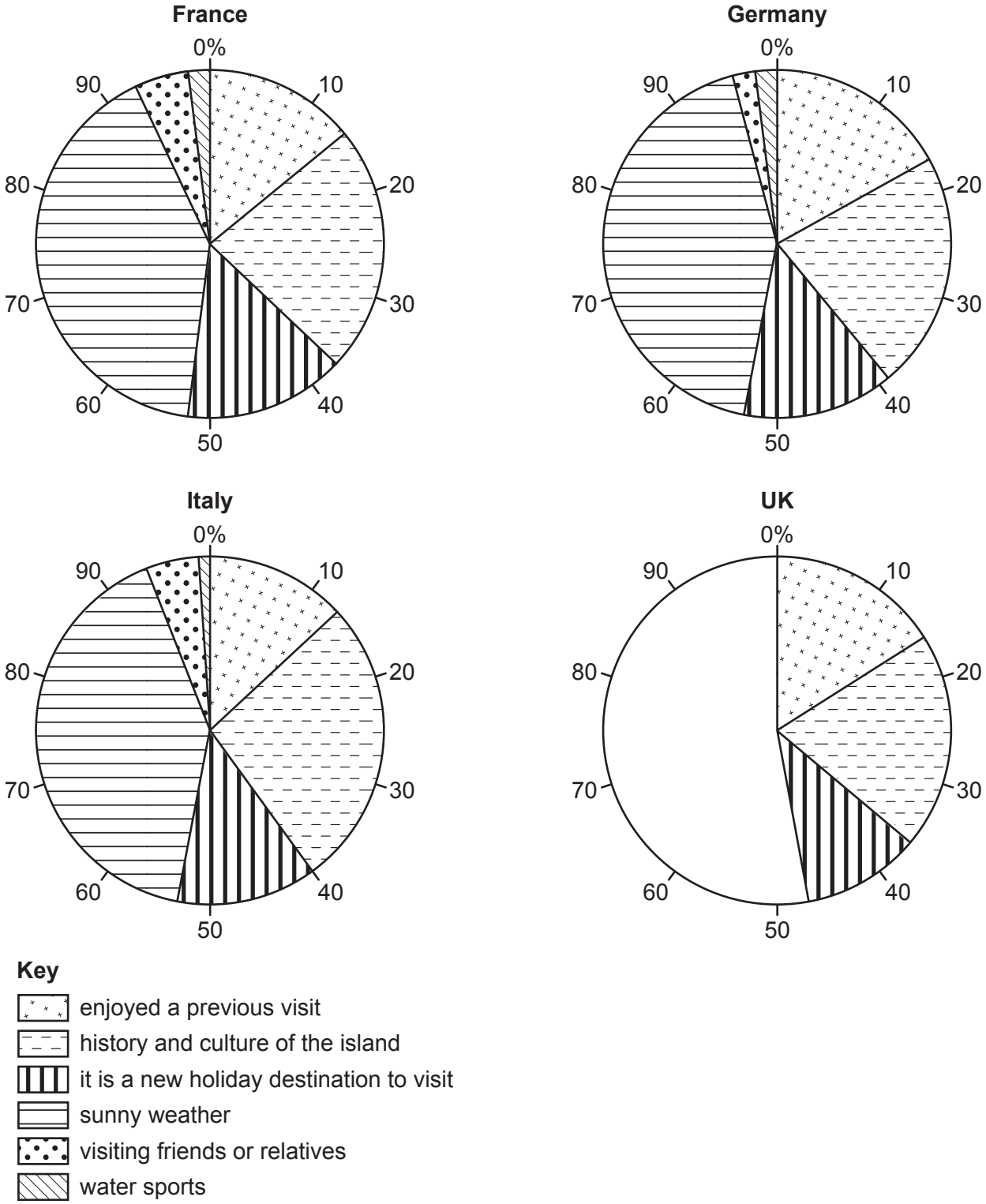


**Fig. 1.5**

**(ii)** Do the results of these four countries support **Hypothesis 2:** *Tourists from different countries visit Malta for different reasons*? Support your conclusion with evidence from Fig. 1.5 and Table 1.2.

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..... [4]

**(f)** The results of Question 4 in the questionnaire *(Which **one** of the following most influenced your choice of Malta for your holiday?)* are shown in Table 1.3 (Insert).

**(i)** Use these results to **complete Fig. 1.6 below**. [2]

**Answers to Question 4 (Which one of the following most influenced your choice of Malta for your holiday?)**

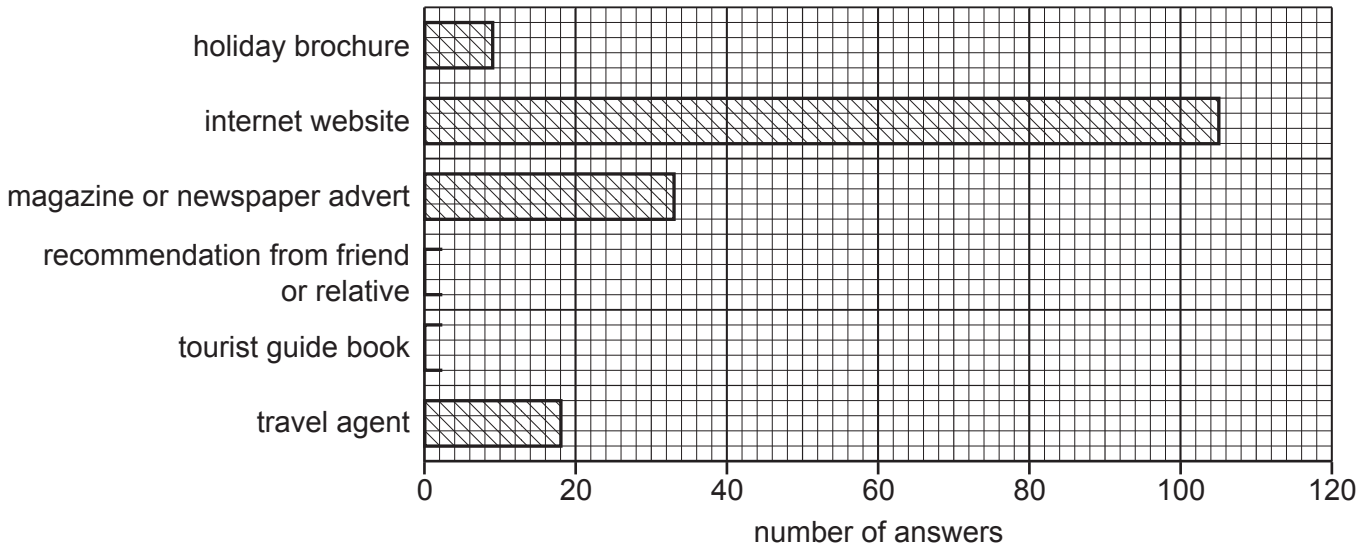


**Fig. 1.6**

**(ii)** Suggest how the Malta Tourism Authority could use the information in Fig. 1.6 and Table 1.3 to increase the number of tourists visiting Malta.

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..... [2]

**(g)** Describe **two** likely benefits and **two** likely disadvantages of tourism for the local people in Malta.

Benefits

1 .....

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2 .....

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Disadvantages

1 .....

.....

2 .....

..... [4]

[Total: 30]

**2** Students in Wisconsin, USA, took part in a community project to test if the local river was becoming less polluted. To investigate this they did fieldwork on the Trade River. Before they started their fieldwork, their teacher warned them about the dangers of working in the river.

**(a)** In the table below suggest different precautions that the students might take to protect themselves while doing tests in the water.

| possible danger | precaution to protect students |
|---|---|
| infection from the water | ..... ..... ..... |
| insects or animals in the river | ..... ..... ..... |
| sharp stones on the river bed | ..... ..... ..... |

[3]

The students investigated two hypotheses.

**Hypothesis 1:** *The oxygen level in the river was higher in 2018 than in 2015.*

Oxygen is essential for animals to live in rivers. The oxygen level of water increases as it becomes less polluted.

**Hypothesis 2:** *The Biotic Index increased between 2015 and 2018.*

The Biotic Index is a way of measuring water pollution by looking at the animals that live in the river.

**(b)** The students used a digital meter to measure the oxygen level of the water. This meter and a student using the meter are shown in Fig. 2.1 (Insert).

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

1 .....

.....

2 .....

..... [2]

**(ii)** The students measured the oxygen level of the water at five sites along the Trade River. These sites had previously been measured by community volunteers in 2015. The results of measurements taken in 2015 and 2018 are shown in Table 2.1 (Insert).
**Plot the oxygen level at site 5 in 2018** in Fig. 2.2 below. [1]

**Results of oxygen level measurements**

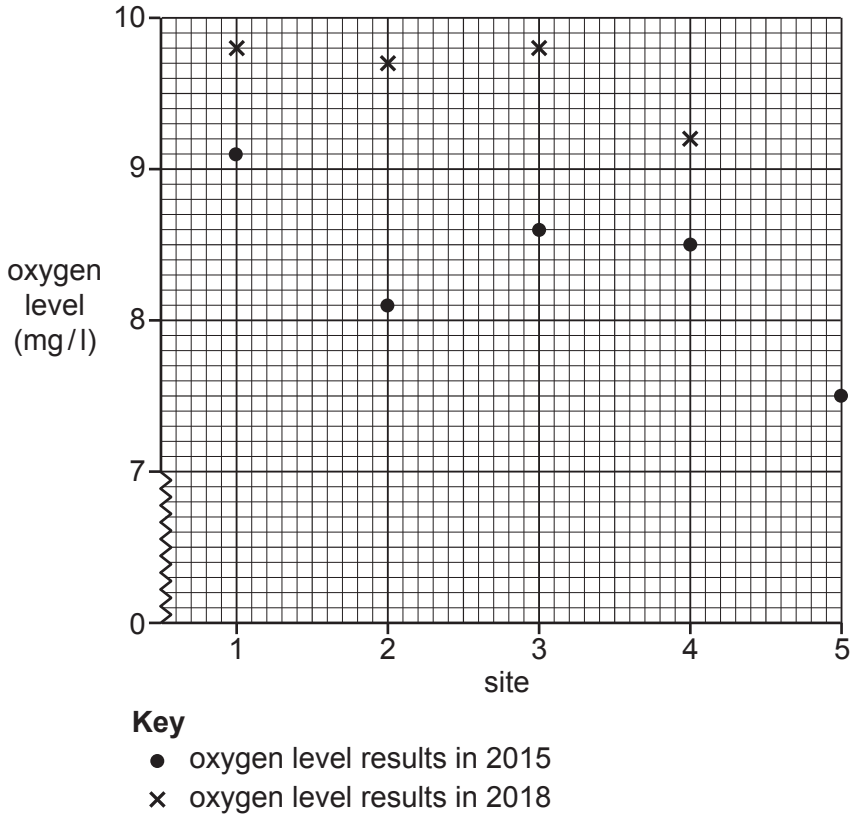


**Fig. 2.2**

**(iii)** What conclusion would the students make about **Hypothesis 1:** *The oxygen level in the river was higher in 2018 than in 2015*? Use evidence from Fig. 2.2 and Table 2.1 to support your decision.

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..... [3]

**(c)** To investigate **Hypothesis 2:** *The Biotic Index increased between 2015 and 2018*, the students did the investigation described in Fig. 2.3 (Insert) at the five sites along the river.

**(i)** Before the students began working at the five fieldwork sites, they did a pilot study on the Trade River near their school. Explain what a pilot study is and give **one** reason for doing a pilot study.

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..... [2]

**(ii)** Use Fig. 2.3 to explain why the students disturbed the river bed when carrying out the fieldwork.

.....

..... [1]

**(iii)** Use Fig. 2.3 to explain why the students needed to identify the different types of animals found at each site while sampling.

.....

..... [1]

**(d)** To calculate a Biotic Index score for each site the students used the following method. An example of their recording sheet at site 2 is shown in Fig. 2.4 (Insert).

1 On the recording sheet circle each animal that matches those found in the sample.
2 Count the number of animals that are circled in each group and write the number in the box. Only count the number of types of animals.
3 Multiply the number of animals identified in each group by the group value.
4 Repeat this for all groups of animals.

**(i)** Which biotic group contains the sowbug?

..... [1]

The Biotic Index calculation for site 2 in Fig. 2.4 is shown below.

Number of animals circled in group 1 x group value 1 x 4 = 4

Number of animals circled in group 2 x group value 5 x 3 = 15

Number of animals circled in group 3 x group value 1 x 2 = 2

Number of animals circled in group 4 x group value 1 x 1 = 1

Total number of animals = 8

Total value = 22

$$\text{Biotic Index score} = \frac{\text{Total value}}{\text{Total number of animals}} = \frac{22}{8} = 2.8$$

**(ii)** The recording sheet for the site of the students' pilot study is shown in Fig. 2.5 opposite. **Complete this recording sheet** by putting in the number of animals identified in group 2. [1]

**(iii)** **Calculate the Biotic Index score** for the pilot study site below. [2]

Number of animals circled in group 1 x group value =

Number of animals circled in group 2 x group value =

Number of animals circled in group 3 x group value =

Number of animals circled in group 4 x group value =

Total number of animals =

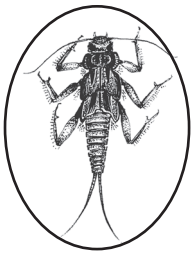
Total value =

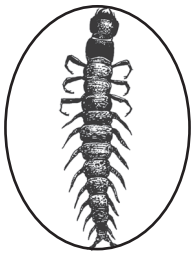
$$\text{Biotic Index score} = \frac{\text{Total value}}{\text{Total number of animals}} =$$

**Biotic Index Recording Sheet**

**Trade River site number PILOT**

**Group 1: These do not live in polluted water. Circle each animal found.**


Stonefly


Dobsonfly


Alderfly


Water Snipe Fly

**No. of group 1 animals circled:** 3

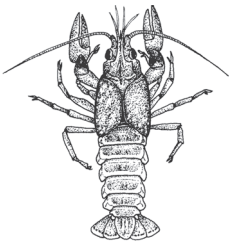
**Group Value = 4**

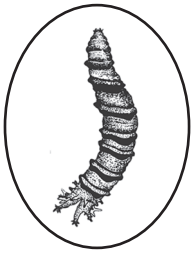
**Group 2: These can live in water which is slightly polluted. Circle each animal found.**

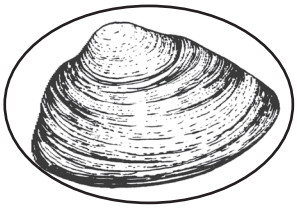

Caddisfly

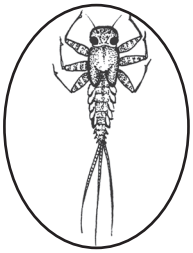

Dragonfly


Water Penny


Crawfish


Crane Fly


Freshwater Mussel


Mayfly


Damselfly


Riffle Beetle

**No. of group 2 animals circled:**

**Group Value = 3**

**Group 3: These can tolerate more polluted water. Circle each animal found.**


Black Fly


Non-Red Midge


Snail

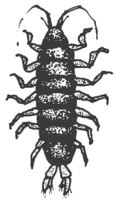

Amphipod

**No. of group 3 animals circled:** 1

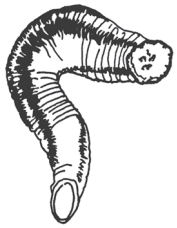
**Group Value = 2**

**Group 4: These can live in polluted water. Circle each animal found.**


Pouch Snail


Sowbug


Bloodworm Midge


Leech


Tubifex Worm

**No. of group 4 animals circled:** 1

**Group Value = 1**

Drawings are NOT to scale

**Fig. 2.5**

**(iv)** Table 2.2 (Insert) shows the Biotic Index score for the five fieldwork sites measured in 2015 and 2018.
**Plot the Biotic Index scores for site 3 in 2015 and 2018** in Fig. 2.6 below. [2]

**Biotic Index scores at the five sites**

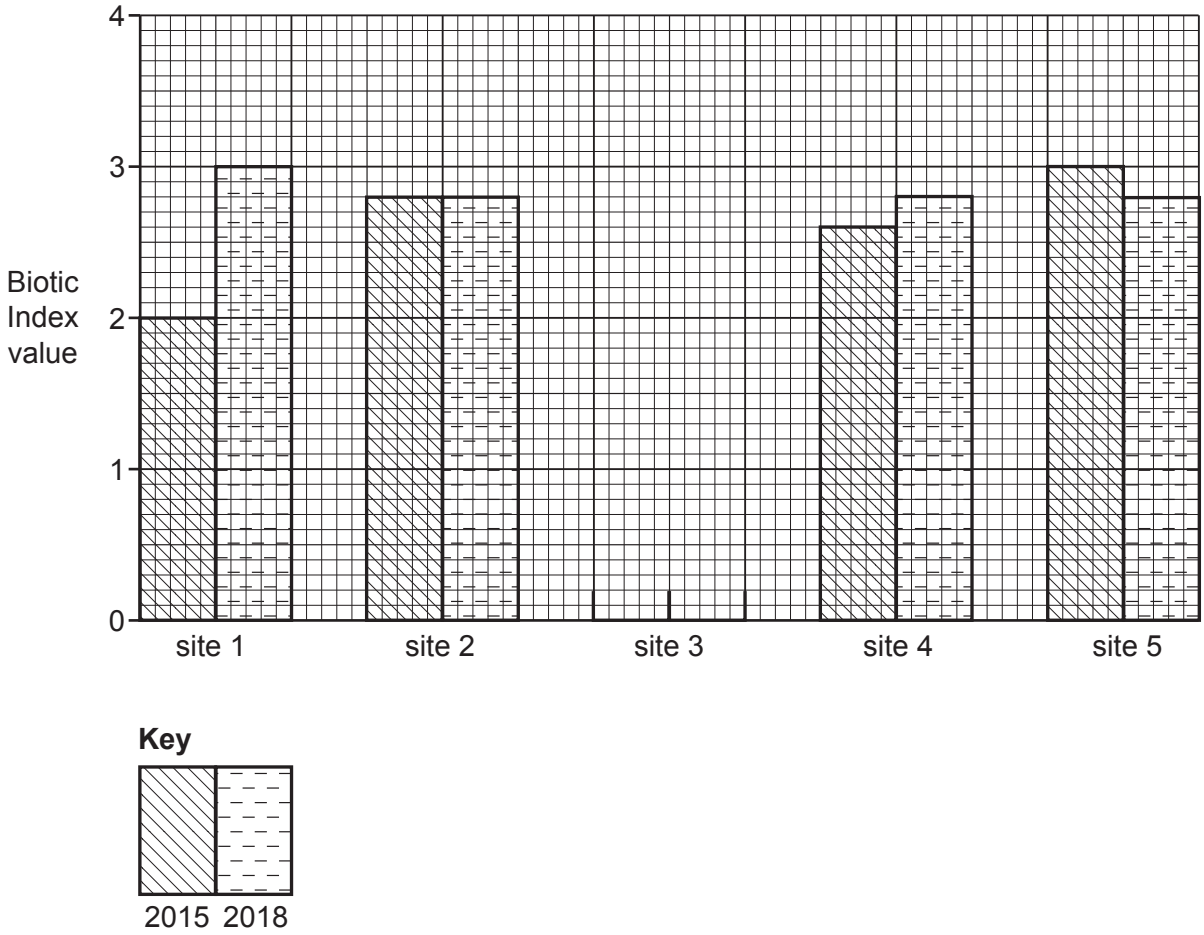



**Fig. 2.6**

**(v)** Do the results agree with **Hypothesis 2:** *The Biotic Index increased between 2015 and 2018*? Tick (✓) your decision below and support it with evidence from Fig. 2.6 and Table 2.2.

| decision | tick (✓) |
|---|---|
| Agree for all sites | |
| Agree for some sites | |
| Disagree for all sites | |

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..... [4]

**(vi)** Suggest **two** reasons why water pollution levels may vary along a river.

1 .....

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2 .....

..... [2]



**[Turn over**

**(e)** Suggest another hypothesis that students might investigate through fieldwork in a river. Do **not** refer to water pollution. Describe a fieldwork method to test this hypothesis.

Hypothesis

.....

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Fieldwork method

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..... [5]

[Total: 30]

## Additional Pages

If you use the following lined pages to complete the answer(s) to any question(s), the question number(s) must be clearly shown.

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