



Cambridge International Examinations  
Cambridge Pre-U Certificate

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**GEOGRAPHY (PRINCIPAL)**

**9768/04**

Paper 4 Research Topic

**For Examination from 2016**

SPECIMEN MARK SCHEME

**1 hour 30 minutes**

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**MAXIMUM MARK: 50**

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The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 3 Pre-U Certificate.

This document consists of **17** printed pages, **1** blank page.

### Section A: Small-Scale Ecosystems

1 Study Fig. 1, which shows plant species along a woodland transect.

(a) Using Fig. 1, name the plant species recorded at sample site 6 on the transect. [2]

- Oak, ivy, dog's mercury and bluebells

All four required for 2 marks; two or three named = 1 mark; less than two named = 0 marks

(b) Contrast the occurrence of couch grass with that of ivy along the transect shown in Fig. 1. [4]

Credit any four valid contrasts. Candidates must refer to Fig. 1 for full marks – e.g.

- Couch grass – abundant at sites 1, 2, 3, but no ivy at these sites
- Couch grass abundant – ivy never abundant
- Sites 4 and 5 couch grass declines, ivy increases
- No couch grass sites 6–10, ivy occasional

Study Fig. 2, which shows the relationship between distance and soil moisture pH along a transect through a sand dune ecosystem.

(c) To what extent is the use of the line of best fit drawn on Fig. 2 valid? Support your answer with evidence from Fig. 2. [6]

Candidates should recognise that the use of a line of best fit seems valid given the data plotted. There is less variation from the line at distances beyond 60m and so the line may be more valid here than in the earlier part of the transect. More able candidates may point out that the pH values appear to be discrete rather than continuous.

The best fit line, however, is precisely that, a best fit, which demonstrates an element of compromise or judgement.

**L3:** Clear and detailed assessment of the validity of the line of best fit. Extensive and accurate data support from the graph. [5–6]

**L2:** A limited assessment of the validity of the line. Provides some data support at the top end of the level. [3–4]

**L1:** Simple description, little or no reference to the line of best fit. Use of data support is inaccurate or lacking. [0–2]

- (d) Assess the usefulness of the types of diagram shown in Figs 1 and 2 to those responsible for managing small-scale ecosystems. [8]**

The question is open, referring to any small-scale ecosystem, therefore candidates need not refer specifically to the ecosystems already mentioned.

Managing small-scale ecosystems is a complex process and depends on the understanding of a range of factors and processes and how they interact.

Fig. 1 gives a good visual impression of the spatial distribution and frequency of plant species. This type of data is often represented by kite diagrams which have the benefit of emphasising the growth and disappearance of species.

Fig. 2 gives a good visual presentation of the relationship between the two variables along the length of the transect.

However, both Figs 1 and 2 deal only with a transect – they may not be representative of the whole ecosystem.

Additionally, there is no information about other factors which would undoubtedly be of relevance – e.g. climatic, biotic, abiotic and human factors for instance.

**L3:** Clear and detailed analysis of the usefulness and limitations of the resources. Evaluation is to the fore and the points made are well supported. A clear understanding of other data which would be of use. **[6–8]**

**L2:** Some analysis of the usefulness and limitations of the resources which may be unbalanced. Provides support for some observations. At the top end there may be a limited awareness of other data which might be useful. **[3–5]**

**L1:** Little understanding of the usefulness of the resources; perhaps simple description. Support is inaccurate or lacking. **[0–2]**

2 Study Fig. 3, which shows the location of two species of bluebell in the Borough of Halton, near Liverpool, England, in 2007.

(a) Using Fig. 3, to what extent is the spatial distribution of bluebells on the northern side of the River Mersey different from that on the southern side of the river? [5]

Candidates need to make an assessment as to the extent of any difference – given the nature of the resource this may be anywhere on the spectrum from total disagreement to complete agreement. The key requirement is that the judgement is supported by evidence from the resource.

Accept any valid points, for example candidates may make reference to:

- the smaller overall number to the north of the river compared with the south
- the larger number within urban areas to the south
- the larger and more scattered nature of Spanish bluebells to the north and only one clearly within an urban area

**L3:** Clearly focused on the evaluative aspect of the question.  
The map is well used to support the points made. [4–5]

**L2:** A limited range of valid points, but little evaluation.  
There is reference to the resource to support the points. [2–3]

**L1:** Limited ability to interpret the resource, perhaps weak description.  
Use of data is inaccurate or lacking. [0–1]

- (b) **‘While the successful management of small-scale ecosystems presents challenges, it should also provide opportunities.’**

**From your wider study of small-scale ecosystems, to what extent do you agree with this statement?**

**[10]**

An opportunity for candidates to demonstrate what they know about the management of small-scale ecosystems. The best answers will clearly address the evaluative nature of the question.

Clearly, much depends on the chosen small-scale ecosystem(s).

Possible challenges will probably include the classic conservation/public access dilemma. Other threats might be linked to human activities (e.g. pollution) or to physical threats (e.g. volcanic activity).

Opportunities could include employment, tourism, economic development, scientific progress etc.

- L3:** Evaluation is to the fore with sophisticated exemplar support.  
There is clear consideration of challenges and opportunities. **[8–10]**
- L2:** An understanding of the management of small-scale ecosystems with only a limited attempt at evaluation. **[5–7]**
- L1:** There is some reference to small-scale ecosystems but the approach is largely descriptive. **[0–4]**

## EITHER

- 3 With reference to your own investigation of small-scale ecosystems, to what extent did the scale of your investigation limit the conclusions you were able to draw?**

**Begin by stating the question or hypothesis that you investigated.**

**[15]**

There is no correct answer to this, so responses could legitimately range from “to only a limited extent” to “only a very small extent”. Much depends upon the nature of the investigation.

Mark on the quality of the discussion, especially the way in which the argument is supported. Expect candidates to explore issues such as temporal and/or spatial limitations, the representativeness of their sample of the whole population, and the extent to which their conclusions could be extended to larger scales.

- L4:** The scale of the investigation and its limitations are to the fore.  
The candidate displays a high order understanding. Scale is explored in more than one dimension. The discussion is well supported by reference to the candidate’s own investigation. **[13–15]**
- L3:** Good knowledge and depth of understanding of the issue of scale and the limitations it imposes. The answer makes appropriate reference to the candidate’s own investigation. Well focused on the question. **[10–12]**
- L2:** Generally focused on the candidate’s own investigation.  
Will address the issue of scale but in a superficial or skeletal fashion. **[7–9]**
- L1:** Discussion lacks detail. Perhaps descriptive only, with little attempt to address the issue of scale. Little reference to candidate’s own investigation. **[0–6]**

OR

- 4 With reference to examples from your own investigation of small-scale ecosystems, discuss how you developed and improved your methods of data collection.**

**Begin by stating the question or hypothesis that you investigated.**

[15]

Answers should be based firmly on their own investigations, quoting examples drawn from these.

Clearly, much depends on the investigation and the choice of methods. Although some description of the preliminary or pilot work is justified, the command word discuss should focus the better candidates on developments and improvements to their initial methods and the justification for these changes, probably in terms of representativeness, reliability, precision and accuracy. Better candidates may evaluate the success of the changes to the method, with detail going beyond the standard text book methodology.

- L4:** The candidate displays a high order understanding of the developments and improvements made and clearly justifies the final methods chosen. Evaluates how successful the chosen methods or changes were. **[13–15]**
- L3:** Good understanding of developments and improvements and justifies the improvements made to the initial methods. The answer makes appropriate reference to the candidate's own investigation. Well focused on the question. **[10–12]**
- L2:** Generally focused on the candidate's own investigation. Describes developments and improvements, but in only a superficial fashion. The approach may go little beyond "take more measurements". **[7–9]**
- L1:** Discussion lacks detail. Perhaps descriptive only, with little evidence of any development or improvement to the methods. Little reference to candidate's own investigation. **[0–6]**

## Section B: Managing Rural Environments

5 Study Fig. 4, which shows employment type in National Parks and in England and Wales in 2011.

- (a) Giving evidence from Fig. 4, in which employment type shown is there the largest difference between National Parks and the total for England and Wales? [2]
- Agriculture, forestry and fishing
  - 1 to 5.4/ a difference of 4.6

Study Fig. 5, which shows internal migration for rural and major urban areas in England from 2000 to 2010.

- (b) Using Fig. 5, contrast the internal migration trend for rural areas with that for major urban areas in England between 2000 and 2010. [4]

Credit any four valid contrasts. Candidates must refer to Fig. 5 for full marks – e.g.

- Initial decline for urban vs initial growth (2000/01 to 2003/04)
- Then urban growth to 2005/6 vs rural decline, similarly from 06/07 to 08/09
- Urban decline 09/10, rural growth at same time
- Credit references to the smaller changes in rural compared to urban, as well as reference to the rural vs urban mirror image effect apparent on the graph

Study Fig. 6, which shows the percentage change in population size for selected National Parks in England and Wales between 2001 and 2011.

- (c) 'A common picture appearing across National Parks is an ageing population.'

How far does Fig. 6 support this statement? [6]

For the three National Parks shown there appears to be general agreement with the statement, although there are considerable differences both in the magnitude of the changes and in terms of the age groups concerned.

Good answers will make a judgement and highlight the differences between the three National Parks.

**L3:** The evaluative aspect is to the fore.  
Extensive and accurate data support from the graph. [5–6]

**L2:** Mostly descriptive.  
Only a limited attempt at the evaluative aspect of the question.  
Provides some data support at the top end of the level. [3–4]

**L1:** Simple description, little or no reference to the statement.  
Use of data support is inaccurate or lacking. [0–2]

- (d) **Assess the usefulness of Figs 4, 5 and 6 to those responsible for managing rural environments.**

[8]

The question is open, referring to any rural environment.

Managing rural environments is a complex process and has a number of dimensions – economic, environmental, cultural, political and historical are those most likely to have been studied by candidates.

Figs 4 and 6 give information about National Parks, Fig. 5 about 'rural areas'. The resources cover population and employment, with Figs 5 and 6 having the benefit of changes through time.

The resources have their limitations – e.g. Fig. 4 has very broad employment categories; none of the resources distinguishes different types of rural areas.

Good responses will address some of these points and focus clearly on the evaluative aspect of the question.

**L3:** Clear and detailed analysis of the usefulness and limitations of the resources. Evaluation is to the fore and the points made are well supported. A clear understanding of other data which would be of use. **[6–8]**

**L2:** Some analysis of the usefulness and limitations of the resources which may be unbalanced. Provides support for some observations. At the top end there may be a limited awareness of other data which might be useful. **[3–5]**

**L1:** Little understanding of the usefulness of the resources; perhaps simple description. Support is inaccurate or lacking. **[0–2]**

**6 Study Fig. 7, a 1:50,000 OS map extract of a rural area in SW Northumberland, England.**

- (a) Using Fig. 7, outline the ways in which conflicts might arise between different groups of visitors to the rural area shown on the map. [5]**

There is map evidence of several different groups of visitors and this should be cited – cyclists, walkers, those interested in historical sites, visitors to the nature reserve, day trippers using the picnic site and viewpoints, the visitor centre. However, the key point is that possible conflicts between some or all of these different groups is highlighted.

**L3:** Clearly focused on at least two conflicts between different groups of users. Map evidence is well used to support the points made. **[4–5]**

**L2:** A limited range of valid points, but little discussion of possible conflicts. There is reference to the map to support the points. **[2–3]**

**L1:** Limited ability to interpret the map, perhaps weak description. Use of map evidence is inaccurate or lacking. **[0–1]**

- (b) ‘Changes in rural areas have produced both winners and losers.’**

**From your wider study of managing rural environments, to what extent do you agree with this statement? [10]**

An opportunity for candidates to demonstrate what they know about the changes which have taken place in rural environments. The best answers will clearly identify winners and losers, perhaps pointing out that some communities may be both winners and losers, while addressing the evaluative nature of the question.

Clearly, much depends on the chosen rural environments.

Possible changes are most likely to be framed in social, economic and physical terms. Winners and losers don’t have to be individuals – communities, organisations, businesses etc. would all be acceptable. Additionally, differences between different types of rural areas would be acceptable e.g. those areas close to urban areas compared to remote areas would provide a useful framework.

**L3:** Evaluation is to the fore with sophisticated exemplar support. There is clear consideration of winners and losers. **[8–10]**

**L2:** An understanding of the changes in rural environments with only a limited attempt at evaluation. **[5–7]**

**L1:** There is some reference to rural environments but the approach is largely superficial, lacking convincing detail. **[0–4]**

## EITHER

- 7 With reference to your own investigation of managing rural environments, to what extent did the scale of your investigation limit the conclusions you were able to draw?**

**Begin by stating the question or hypothesis that you investigated.**

**[15]**

There is no correct answer to this, so responses could legitimately range from “to only a limited extent” to “only a very small extent”. Much depends upon the nature of the investigation.

Mark on the quality of the discussion, especially the way in which the argument is supported. Expect candidates to explore issues such as temporal and/or spatial limitations, the representativeness of their sample of the whole population, and the extent to which their conclusions could be extended to larger scales.

- L4:** The scale of the investigation and its limitations are to the fore. The candidate displays a high order understanding. Scale is explored in more than one dimension. The discussion is well supported by reference to the candidate’s own investigation. **[13–15]**
- L3:** Good knowledge and depth of understanding of the issue of scale and the limitations it imposes. The answer makes appropriate reference to the candidate’s own investigation. Well focused on the question. **[10–12]**
- L2:** Generally focused on the candidate’s own investigation. Will address the issue of scale but in a superficial or skeletal fashion. **[7–9]**
- L1:** Discussion lacks detail. Perhaps descriptive only, with little attempt to address the issue of scale. Little reference to candidate’s own investigation. **[0–6]**

OR

- 8 With reference to examples from your own investigation of managing rural environments, discuss how you developed and improved your methods of data collection.**

**Begin by stating the question or hypothesis that you investigated.**

**[15]**

Answers should be based firmly on their own investigations, quoting examples drawn from these.

Clearly, much depends on the investigation and the choice of methods. Although some description of the preliminary or pilot work is justified, the command word discuss should focus the better candidates on developments and improvements to their initial methods and the justification for these changes, probably in terms of representativeness, reliability, precision and accuracy. Better candidates may evaluate the success of the changes to the method, with detail going beyond the standard text book methodology.

**L4:** The candidate displays a high order understanding of the developments and improvements made and clearly justifies the final methods chosen. Evaluates how successful the chosen methods or changes were. **[13–15]**

**L3:** Good understanding of developments and improvements and justifies the improvements made to the initial methods. The answer makes appropriate reference to the candidate's own investigation. Well focused on the question. **[10–12]**

**L2:** Generally focused on the candidate's own investigation. Describes developments and improvements, but in only a superficial fashion. The approach may go little beyond "take more measurements". **[7–9]**

**L1:** Discussion lacks detail. Perhaps descriptive only, with little evidence of any development or improvement to the methods. Little reference to candidate's own investigation. **[0–6]**

## Section C: Fluvial Geomorphology

9 Study Fig. 8, which shows the relationship between river channel pattern and bed material.

(a) At point X on Fig. 8, 60% of the bed material is composed of solid rock. State the percentages of bed material that are sand and gravel and clay and organic material. [2]

- 25% sand and gravel
- 15% clay and organic material

(b) Using Fig. 8, contrast the bed material in a river at Y with that found in a river at Z. [4]

- Y = 39% sand & gravel; 10% solid rock; 51% clay etc.
- Z = 93% sand & gravel; 1 or 2% solid rock; 5 % clay

(allow tolerance of + or – 1; must sum to 100%)

2 marks for reading and stating the correct proportions from Fig. 1.

2 marks for statements contrasting the bed material.

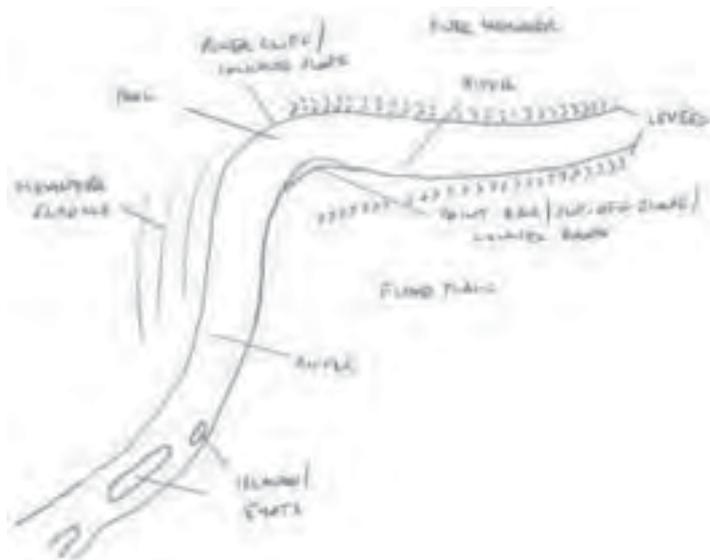
Study Fig. 9, which is a 1:50 000 OS map extract showing part of the River Spey in Scotland, and Photograph A of part of the River Spey shown on Fig. 9.

(c) Draw a simple sketch map of the course of the river shown in Photograph A. Using information from both the map extract and the photograph, clearly label the fluvial landforms you can identify. [6]

**L3:** A recognisable shape; all/almost all landforms identified. Clear and accurate labels; has clearly used both the photograph and the map. [5–6]

**L2:** A recognisable shape.  
Some of the landforms labelled.  
Wrong area drawn = max 3 [3–4]

**L1:** A weak sketch, wrong shape.  
Very few labels or labels incorrect or label arrows loose.  
NB Braiding; Confluence; Bluff all = 0; accept Terrace [0–2]



- (d) It has been suggested that the stretch of the River Spey shown on Fig. 9 should be straightened.

Assess the usefulness of Figs 8 and 9 and Photograph A to those responsible for making the decision about straightening the river course. [8]

Straightening river courses is usually done to alleviate flooding problems. A range of responses is acceptable, from “of limited use” through to “of great use”. Look for the strength of argument to indicate quality.

The OS map would be of great help – choosing the new course, it gives some indication of land use through which the new course cuts, gradient may be judged. A larger scale would be more useful (1:25 000 or greater). Similarly Photograph A gives information about land use and may help to plan the new course, although the photo is of only one meander.

Fig. 1 would clearly be of use in the choice of bed materials for the newly straightened channel.

Straightening inevitably has ‘knock-on’ effects elsewhere in the drainage basin and the three resources give little information about these.

**L3:** Clear and detailed analysis of the usefulness and limitations of the resources. An overview should be present. The resources are well used to support the points made. A clear understanding of other resources which would be of use. [6–8]

**L2:** Some analysis of the usefulness and limitations of the resources, which may be unbalanced. Provides support for some observations. At the top end there may be a limited awareness of other resources which might be useful. [3–5]

**L1:** Little understanding of the usefulness of the resources; perhaps simple description. Support is inaccurate or lacking. [0–2]

**10 Study Fig. 10, which shows bedload particle diameter and distance from the source of one river in the UK.**

**(a) 'Bedload particle diameter decreases downstream.'**

**Consider the extent to which the data in Fig. 10 supports this hypothesis. [5]**

It is possible to argue that the figure supports the hypothesis, or that it doesn't, or that it does to some extent.

Whichever argument is chosen, look to the quality of support from Fig. 10 to judge the quality of the response. Do not credit explanation.

A number of valid points could be made:

- The median value remains almost unchanged
- The range of sizes decreases downstream
- As does the range of the middle 50%
- The lower quartile value increases; the upper quartile is variable
- The short distance (2 to 6 km) may not be long enough to show changes

**L3:** Clear and detailed analysis of the extent to which the diagram supports the hypothesis. Data is well used to support the points made. **[4–5]**

**L2:** A valid attempt to assess the extent to which the graph supports the statement. Data is used to support the points. **[2–3]**

**L1:** Limited ability to interpret the graph, may simply describe. Use of data is inaccurate or lacking. **[0–1]**

**(b) 'The unexpected negative effects produced by modification of river channels are often greater than the expected benefits.'**

**From your wider study of fluvial geomorphology, to what extent do you agree with this statement? [10]**

Good answers will refer to a range of river schemes and a range of scales with a clear attempt to address the evaluative nature of the question. There should be an attempt to balance the benefits against the problems.

Possible benefits could/should include the control of flooding by increasing the gradient, the efficiency of the channel and by increasing the discharge that the channel can hold. Drawbacks could include a range of hydrological, environmental, social and economic issues, depending on the examples chosen.

**L3:** Evaluation is to the fore with sophisticated exemplar support. Both benefits and problems are discussed, though a balance is not required for full marks. At least two schemes are discussed. **[8–10]**

**L2:** An understanding of the benefits and problems drawn from more than one scheme or at different scales with only a limited attempt at evaluation. **[5–7]**

**L1:** There is some reference to modifications of rivers but the approach is largely descriptive. No exemplar support. **[0–4]**

## EITHER

- 11 **With reference to your own investigation of fluvial geomorphology, to what extent did the scale of your investigation limit the conclusions you were able to draw?**

**Begin by stating the question or hypothesis that you investigated.**

**[15]**

There is no correct answer to this, so responses could legitimately range from “to only a limited extent” to “only a very small extent”. Much depends upon the nature of the investigation.

Mark on the quality of the discussion, especially the way in which the argument is supported. Expect candidates to explore issues such as temporal and/or spatial limitations, the representativeness of their sample of the whole population, and the extent to which their conclusions could be extended to larger scales.

- L4:** The scale of the investigation and its limitations are to the fore. The candidate displays a high order understanding. Scale is explored in more than one dimension. The discussion is well supported by reference to the candidate’s own investigation. **[13–15]**
- L3:** Good knowledge and depth of understanding of the issue of scale and the limitations it imposes. The answer makes appropriate reference to the candidate’s own investigation. Well focused on the question. **[10–12]**
- L2:** Generally focused on the candidate’s own investigation. Will address the issue of scale but in a superficial or skeletal fashion. **[7–9]**
- L1:** Discussion lacks detail. Perhaps descriptive only, with little attempt to address the issue of scale. Little reference to candidate’s own investigation. **[0–6]**

OR

- 12 With reference to examples from your own investigation of fluvial geomorphology, discuss how you developed and improved your methods of data collection.**

**Begin by stating the question or hypothesis that you investigated.**

**[15]**

Answers should be based firmly on their own investigations, quoting examples drawn from these.

Clearly, much depends on the investigation and the choice of methods. Although some description of the preliminary or pilot work is justified, the command word discuss should focus the better candidates on developments and improvements to their initial methods and the justification for these changes, probably in terms of representativeness, reliability, precision and accuracy. Better candidates may evaluate the success of the changes to the method, with detail going beyond the standard text book methodology.

- L4:** The candidate displays a high order understanding of the developments and improvements made and clearly justifies the final methods chosen. Evaluates how successful the chosen methods or changes were. **[13–15]**
- L3:** Good understanding of developments and improvements and justifies the improvements made to the initial methods. The answer makes appropriate reference to the candidate's own investigation. Well focused on the question. **[10–12]**
- L2:** Generally focused on the candidate's own investigation. Describes developments and improvements, but in only a superficial fashion. The approach may go little beyond "take more measurements". **[7–9]**
- L1:** Discussion lacks detail. Perhaps descriptive only, with little evidence of any development or improvement to the methods. Little reference to candidate's own investigation. **[0–6]**

