



**General Certificate of Education (A-level)  
January 2012**

**Environmental Studies**

**ENVS1**

**(Specification 2440)**

**Unit 1: The Living Environment**

***Report on the Examination***

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## General

The mean mark of this paper was higher than in previous years. It produced a good spread of marks with a standard deviation that was higher than most of the earlier papers. There was no evidence that students were unable to finish in the allotted time and even the weakest gained credit.

Many students lost marks by not expressing themselves clearly and with precision. Correct use of scientific terminology is tested and it is important to note that single word answers and short phrases are generally not enough when a description or explanation is required. Consequently, it must be re-emphasised that careful reading of the questions is necessary and that there is no need to rewrite the stem. Poor examination technique, for example listing more alternatives than required, may also lose marks.

### Question 1

- (a) The features of the graph were not well known, although most students knew 'carrying capacity' and 'lag phase'. There was general confusion over the point at which overexploitation occurs and what the effects of density independent factors may be. Point E was frequently given as the incorrect answer to both the second and third options and point G was mistaken for the lag phase.
- (b) Fewer than 50% gave a suitable example of a density independent factor. Availability of food and disease were the most commonly given wrong answers.

### Question 2

- (a) This question was well answered with over 80% of students gaining full marks. Noise and habitat destruction were the most frequent correct answers. It should be emphasised that vague references to 'pollution' will not gain credit unless qualified, eg as *noise*, *visual* or *air* pollution.
- (b) The purpose of Green Belt designation in preventing urban sprawl was very well known, and most got this mark. About 30% gained both marks and the better students mentioned all three marking points, clearly demonstrating that they understood the concept. However, there is still a widespread misconception that the purpose of the Green Belt designation is to protect wildlife or to promote outdoor recreation.
- (c) (i) About 25% of students gained both marks and less than 60% scored one. Although zoning as a concept seemed to be understood, students were unable to explain it clearly, giving a great deal of waffle instead. Those that did gain a mark had often given a suitable example. Few stated that zoning is used to reduce land use conflicts. Some appeared to regard zoning as a form of crop rotation, thinking that it allows the land to 'recover'.
- (c) (ii) The term 'enhancement' is not well understood. Those that did answer the question tended to gain full marks quite easily. The question was deliberately quite open, in the hope that students would use their own or more

familiar examples of landscape enhancement. It must be emphasised that this was not about the *protection* of landscape and that vague answers about National Parks and AONBs are irrelevant. Many wrongly focussed on the destruction of habitats.

### Question 3

- (a) (i) Although 70% gained at least one mark for this, the majority tended not to answer the question and instead gave vague definitions of a SSSI. The more able students knew that the SSSI designation protects the habitats of species from development or Potentially Damaging Operations. It is commonly misunderstood that SSSIs are mainly for research or restrict public access.
- (a) (ii) Very poorly answered, with nearly 10% not even attempting to try to answer this question. 25% of students got it right, with most of the rest giving wildly inaccurate responses. Those that could give a law or Act of Parliament frequently could not name it with sufficient accuracy.
- (b) It was disappointing that, at this level, a significant minority of students seem ignorant of the pH scale and stated that acidic conditions indicated *high* pH. However, the majority did make the correct link and stated that the acidic water would dissolve the exoskeleton. Most students however failed to give a valid reason why death would result. Some did not appear to know what 'freshwater' is, or to appreciate that pH has little effect on the oxygen concentration of a body of water.
- (c) 80% of students gained both marks. Although the concept of competition was often mentioned, weaker students failed to gain credit as the resource was not identified.
- (d) Very similar questions have appeared before, and about a third gained all three marks. However, some very poor answers were seen, with frequent confusion of succession with eutrophication or population regulation. Some also inappropriately conflated succession of a lithosere with that of a hydrosere. Those that could describe the process correctly typically got three easy marks for describing how sediment build up decreases water depth, which allows colonisation by rooted plants thus decreasing the habitat available for aquatic species.

### Question 4

- (a) This question was on the whole well answered and produced a good spread of marks. There were some excellent answers, full of accurate scientific terminology, and written with good spelling and grammar, that gained both of the Quality of Written Communication marks. There were straightforward marks for correct descriptions of the evolution of photosynthetic organisms that caused an increase in oxygen and a decrease in carbon dioxide. Many explained that this resulted in the formation of ozone, which in turn enabled the evolution of complex life, free from the harmful effects of excessive ultraviolet radiation.

Typical issues included:

- Answers based on succession, with some appearing to believe that mosses and lichens were the first life forms. These sort of answers often gained a mark for referring to soil formation, nutrient cycling or to the water cycle.
- Confusion about the consequences of ozone formation, especially with the Greenhouse Effect. Many were uncertain about the roles of ultraviolet and infra red radiation
- Widespread ignorance of the timescales involved – in some cases global changes were thought to happen rather quickly.
- The question reflected the published specification and covered global changes made by early life. Some misinterpreted it and described the impacts of trees and cows (and even dinosaurs and elephants).
- Astonishingly there was widespread confusion about photosynthesis and respiration. It was far too common to read that photosynthesis produces carbon dioxide. Also, many students still appear to believe that plants only respire at night. Students must be reminded that it is important to state (correctly) which form of respiration is referred to. Several stated that aerobic respiration produces methane.
- The question asked about how life caused change, so descriptions of the influence of volcanic activity and photolysis (not in the context of photosynthesis) were not credited.
- The Earth's atmosphere does not affect the sun's output, although several stated that more carbon dioxide makes the sun hotter.
- Many students did not know what 'ambient gases' were.

- (b) (i) Fewer than 6% got both marks for this question, and only 25% gained one mark. Nearly 9% did not even attempt it. Clearly there is widespread ignorance of this term. Many apparently concluded that it was how humans controlled the population sizes of organisms. Some, presumably those studying biology, recognised the term homeostasis and confused homeostatic population regulation with control of the internal environment of an organism.
- (b) (ii) Students found this very hard to explain without using the terminology in the question. However, some gave very effective examples. In order to get the second marking point, the concept of sustainability had to be explained, the term itself is not enough since it is given in the stem. Many students seemed to confuse *Maximum Sustainable Yield* with *carrying capacity*. The most frequently occurring incorrect response was in terms of how much an area can support without detrimental effects to the environment.

### Question 5

- (a) Nearly 65% gained both marks for this, with some excellent answers seen, for example the use of fruit flies for genetic research. However, vague references to 'research' were not credited. Some students did not read the question properly and gave answers based on predation. There was also some confusion about the differing roles of decomposers and detritivores. Several students appeared to believe that the purpose of detritivory is to prevent disease by clearing up dead bodies.

- (b) Although pleasingly 20% of students gained all four marks, there were some misunderstandings and poor examination technique evident in many responses. In the context of the question, predatory invertebrates eat crop pests, not the crops themselves. 'Invertebrates' is a term not clearly understood by all and some described how birds could be encouraged. A significant number gave rather unrealistic methods of increasing predatory invertebrates, such as scattering dead insects for them to eat, burning to improve the soil and improving the temperature and light. But the majority of marks that were lost were the result of vague statements such as 'create habitat', 'plant plants to attract them', or 'provide resources'. Providing 'shelter' is not sufficient, unless it is qualified by stating a particular hazard. The question required an outline of how farmland may be *managed*, so buying eggs or boxes of adults was not appropriate. The construction of beetle banks and planting hedgerows were the most frequent correct responses. It would be nice if students could spell 'beetle' as in insect rather than as in the popular beat combo.
- (c) Less than 6% got all four marks; many students have obviously never used a sweep net and were unable to give details of how they are used. Several answered in terms of traps or beating trays. There were some very vague accounts and considerable confusion was apparent because many attempted to answer in terms of diversity or population estimation. The purposes of the Diversity Index and the Lincoln Index were not well understood. Many answered *why* a sweep net should be used rather than *how*. The question only required a description of how the presence of predatory invertebrates could be detected. Better answers indicated a familiarity of the techniques and typically included a description of patterns of sweeping, such as a 'figure of eight' and how white trays and pooters could be used to identify species. Unfortunately for a significant number, responses such as 'record your data', 'analyse your results' and 'observe what you have caught' were not creditworthy.

### Question 6

- (a) There were some good, well-reasoned answers for this question with nearly 25% achieving four or five marks. The better students effectively used the information given, and although Longworth traps are far too small for Wolverines, their use was also credited. There were far too many vague responses and yet again a great deal of uncertainty about the use of Diversity and Lincoln Indices. It was rare to see students who noticed the need to describe how to estimate the density of the population. Many wanted to plot graphs or record results in tables. Few realised the importance of including appropriate details such as avoiding double counting or enabling mixing.
- (b) (i) Nearly 60% gained both marks with the problems of reduced gene pools and inbreeding being widely known. Unfortunately there were still too many students who confuse *inbreeding* with *interbreeding* and believe that it causes mutations. A significant number replicated the stem, recognising that small populations are at risk, but not saying why.
- (b) (ii) Less than 22% of students answered with sufficient detail or precision to gain both marks. Many focussed on the fact that the corridors offer protection, especially from predators, or denning sites, rather than as a safe area to move through. Biological corridors are not just like hedgerows that offer shelter from predators for small animals. Large 'fur-bearing' animals like Wolverines

need protection from humans, or environmental change as in this context, rather than predators. Quite a few answers related to widening the gene pool, as in the previous question, rather than being in the context of the information given in the stem. However, these sorts of responses gained credit as examples of named resources.

- (c) (i) Over 60% of students gained both marks with ease, by giving correct descriptions of the food chain leading to the Wolverines. Better students could have got the marks twice over by giving at least two well-reasoned answers. Weaker students were unable to establish even a simple food chain link, stating that the bird is the producer or base of the food chain. Some answers were very poorly expressed where it was not clear whether the 'it' given in the answer, referred to the Wolverine, the bird or even the tree. Some did not read the question and focussed answers on conservation of tree not the bird, and concluded that Wolverines eat nuts. *Shelter* is not synonymous with *habitat*, so it is incorrect to state that the Whitebark Pine is Wolverine habitat.
- (c) (ii) Nearly 60% of students gained both marks, but the responses frequently revealed a very poor understanding of basic biology. For example, significant numbers thought that plant pathogens infect animals. This was a straightforward question, based on information given in the diagram, but some failed to recognise this and focussed on animals eating the berries and currants that would have poisoned them as they were diseased. Several appeared to believe that Whitebark Pine seed dispersal would stop as animals got distracted by the fruits.
- (d) This question was well answered, with nearly 75% of students scoring both marks. Some gave two very similar ecological reasons based on the above questions, but only gained one ecological reason mark. Some students still listed more than two reasons which runs the risk of one incorrect response negating a correct one. Many thought that Wolverines play an important role in pest control and although we do not expect students to know anything about Wolverines, this illustrates a distinct lack of general knowledge.

### **Mark Ranges and Award of Grades**

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