Cambridge International A Level

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Cambridge International Advanced Level

THINKING SKILLS **9694/41**

Paper 4 Applied Reasoning **October/November 2017**

MARK SCHEME

Maximum Mark: 50

Published

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Question	Answer	Marks
1	*Award 1 mark for any of the following:* • The town used for the graph may have been chosen especially because of its success. • The three stores which lost sales may have been specially chosen for the comparison. • Because the statistics depicted in the graph are proportions of different base figures, the comparisons are meaningless. • The increase in sales was presumably from a very low base and therefore could in fact represent only a small number of customers. • Since the LoKost store was “new”, the rate of growth in the first year was presumably untypical. • There is no reason to suppose that the trend will continue. • “Crowds of customers are deserting other stores” is hardly consistent with the small drops of 5%, 2% and 4% seen at the three other (probably cherry-picked) stores. • The three stores which lost sales do not necessarily sell the same kinds of product as LoKost, and the loss of sales may therefore not be connected to the rise of LoKost. • The author may be exploiting the ambiguity of the word “sales”, which may mean either “transactions” or “turnover”. • It is quite unclear what “the number 1 store in the country” means.	**5**

Question	Answer	Marks
2	*1 mark for each element (maximum 4 if MC not identified)* **CA** – perhaps we have a moral duty to do so [bring these species back] **IC** – It is much more sensible for conservation science to focus resources on tackling the causes of species demise. **IC** – There are more important things to spend money on than de-extinction. **IC** – De-extinction is by no means guaranteed to work. **IC** – The two main techniques for de-extinction are both problematic. **IC** – The problems do not end in the laboratory. **CA** – Re-introductions of surviving endangered species can be very successful. **IC** – De-extinction is clearly a bad idea; **MC** – the international scientific community should not be promoting it as the way forward.	**6**

Question	Answer	Marks
3	*2 marks for a developed version of any of the following points.* *1 mark for a weak or incomplete version of any of the following points.* *Paragraph 2* • Assumption: that environmental destruction and species loss could be reduced by spending money • Assumption: that the current rate of extinction will continue unless we intervene • Assumption: that elephants are likely to be among the three quarters of species to become extinct • Appeal to emotion: "Imagine your great (x8) granddaughter having never seen an elephant!" • Assumption: that the money for de-extinction projects would have to be diverted from conservation science • Straw man: "Spending millions trying to bring back a couple of sabre tooth tigers to look at in a zoo will not make up for losing what we already have." trivialises and distorts the objectives of those in favour of de-extinction. *Paragraph 3* • Assumption: that a scientific venture must be guaranteed to work to make it worth promoting as the way forward • Selective example: Mammoth de-extinction requiring elephants as surrogates may have been used as an example as they have a particularly long generation time. Other potential de-extinction candidate species are likely to have modern surrogates with much shorter generation times • Assumption: that selective breeding techniques have not developed to the extent that progress would now be quick enough / that cloning techniques have not achieved a higher success rate since the cloning of Dolly the sheep • Generalisation: from the success rate (1/277) in the Dolly example to cloned animals in general • Straw man: since Dolly was the pioneering example, it is likely that the process was at its least efficient • Assumption: that within the reproductive life-cycle and practices of a female elephant, significantly fewer than 276 eggs are "wasted" • Inconsistency: there is a strong implication that the techniques will not work, but then gives an example (Dolly) of it working. *Paragraph 4* • Assumption: that passenger pigeons did not have sources of food other than the American chestnut • Assumption: that habitats cannot be generated • Contradiction: having claimed that re-introductions are not likely to be successful the author then cites a successful re-introduction. *Paragraph 5* • Assumption: that governments are desirous of diverting funds away from climate change and conservation projects.	**9**

Question	Answer	Marks
4	**'We should encourage scientists to pursue de-extinction projects.'** ***Specimen Level 4 Answers*** *Support (786 words)* The strongly anti-de-extinction Doc 1 acknowledges the inevitable sense of wonder associated with returning species from extinction. There are several reasons we should welcome de-extinction science; wonder is among the greatest of these and even Doc 1 does not attempt to counter this reason. Doc 2 mentions the thrill of seeing a flightless moa and the potential inspiration to a generation of scientists. This is supported by Doc 4 in both point 6 and point 7. Point 6 suggests a potential revenue stream for conservation coming from such projects and point 7 acknowledges the wider benefits of headline-grabbing science. Furthermore, Doc 4.7 is corroborated by the lower graph in Doc 5 which illustrates the apparent success of California condor conservation mentioned in Doc 4. There are many compelling reasons to pursue de-extinction projects. We have a duty to atone for our crimes. Doc 1 also acknowledges, but does not effectively counter, the idea of making amends for extinctions that have been caused by humanity. Doc 3 refers to our 'moral duty' to bring back species from extinction. The idea of morals is subjective but most people would agree that a society in which atonement for crimes or payment of debts is the moral expectation is better than the alternative. Reversing an extinction that was our fault would be a very public reinforcement of a desirable moral code and could, therefore, benefit wider human society. It seems something of a cliché to state that the unknown potential benefits of scientific research are justification enough to encourage such research. In the case of de-extinction, however, there is strong evidence that such benefits are known and could directly help with wider conservation efforts. Document 3 explains that the technology developed in the name of de-extinction can be applied directly to the prevention of extinction in existing endangered species. Since the main thrust of Doc 1's anti-species-resurrection argument is that we should focus on modern endangered species, this strongly weakens Doc 1's whole case. There are some other counter-arguments which ought to be considered. Doc 1 claims that the laboratory technology does not work, at present. This assumes that there will not be significant improvements. Doc 3, on the other hand states, "The process is getting ever cheaper and ever more sophisticated." Doc 4.2 raises an objection about animal welfare related to the cloning process. Doc 4.2 itself is clearly biased as evidenced by the used of loaded, emotional language. Its claim about the size of mammoths in comparison to elephants therefore seems exaggerated. Indeed, the more neutral Doc 2 states that mammoths and another, only slightly larger, modern elephant were similar in size.	**30**

Question	Answer	Marks
4	Related to this idea of 'not-working' is Doc 1's point that the environment is not now suitable for the reintroduction of such species. This line of reasoning may be true in a few specific cases but it is clearly not true in general. Doc 1 cites the demise of the American chestnut as a reason that passenger pigeons should not be reintroduced. Even if we assume that this was their main food source, Doc 3 acknowledges that numbers of the American chestnut are low but states that they are, "on the way back thanks to new genetic techniques". Ignoring the fact that Doc 1 is self-contradictory about the success of species reintroductions, further evidence that Doc 1 is wrong comes from the successful reintroductions of other modern species cited in Doc 3, one of which is the California condor. This is itself corroborated by the graph showing the recovery of the California condor in Doc 5. Particularly interesting is the fact that numbers began to increase significantly only after captive breeding was begun. Individuals born in captivity need to be reintroduced into a wild from which they have been absent – and this presents the same problems as reintroduction of resurrected extinct species. If reintroduction problems can be overcome for the condor, they could be overcome for extinct species. The biggest argument put forward by Doc 1, and Doc 4.5, is the diversion of money away from existing conservation projects. There is no evidence to suggest that the money spent on de-extinction laboratory science necessarily comes from the same 'pot' as that of environmental conservation. Indeed, money spent on habitat conservation would benefit living and resurrected species alike. It seems likely that the publicity generated by such a project could actually divert money towards conservation, as mentioned in Doc 4.6. The upper graph in Doc 5 could support the idea, acknowledged in Doc 1, that projects about big, fierce or fluffy animals attract the most money. De-extinction would likely be such a money generating project. Both financially and scientifically de-extinction science could benefit traditional conservation. We should, therefore, encourage scientists to pursue de-extinction projects. *Challenge (827 words)* We should not encourage scientists to pursue de-extinction projects, for several reasons. With the exception of a handful of very recent extinctions, most of these species became extinct a very long time ago, in environmental terms. Even in the last 50 years the human population has doubled. The planet is a finite size and humans occupy space in the environment. This means there has been a big reduction in available environment in which these species could exist. Doc 1, although flawed, makes a number of valid points in this regard. Any visit to a decent zoo will tell you that Doc 1 is correct when it mentions vastly more captive breeding projects than reintroductions. The few successful reintroductions, mentioned by Doc 3, Doc 4.7 and Doc 5 and acknowledged by Doc 1 (not in contradiction to Doc 1's main argument but as an appreciation of the complexity of the issue), are a mere distraction from the hundreds of species in zoos and botanic gardens with no prospect of anywhere they could thrive in the wild. Even the apparently successful condor reintroduction of Doc 4.7 and Doc 5 might not be such a success story. The graph shows only one year of major population	

Question	Answer	Marks
4	increase and ends in 2009. We cannot tell if 2009 was unique if we have no subsequent data. Doc 4, point 4 introduces the problem of population size. A species, such as the oft-cited passenger pigeon, which lives in flocks, could not survive in the wild unless its numbers were high enough to form flocks. We do not know what size the condor population needs to be in order to remain viable. Doc 1 also mentions the potential harmful effects of introducing a long absent species to a changed habitat. This point is backed up by Doc 4, point 3 which suggests they might become pests or vectors for disease. Document 1 and Document 4.1 cite problems associated with the cloning process itself. While it is possible that these might be overcome in the future, it is worrying that the leader of the expedition reported in Doc 2 is at a loss to explain liquid blood in a thawed out mammoth. Although this is a single report, it does not fuel confidence in the scientists involved. More serious is the apparent contradiction within the de-extinction lobby. The scientist in the Doc 2 report states that finding living cells is the biggest problem; this, presumably, is why formerly frozen mammoths are so much in the frame. However, Doc 3 suggests that suitable cells for other species can be sourced from museum specimens. These two reports then are inconsistent. From a scientific point of view, the benefits of de-extinction are not strongly supported. The financial case against de-extinction is stronger. Doc 1 cites climate change, deforestation, pollution and over-fishing as much more urgent problems. Governments and private sector benefactors do not have limitless money. Often governments have a budget for science and environmental issues. So it is logical that more money for de-extinction projects means less money spent elsewhere. Inevitably the projects that get the most money are the headline-grabbing, big, fierce and cute animals. Doc 1 makes this point and even Doc 3 tacitly acknowledges it by mention of the moa. The top graph in Doc 5 seems to show that the US government spends much more money on ‘sexy’ animals rather than ‘boring’ plants. Whatever the problems with the x-axis, the y-axis difference between plants and animals is obvious. Document 4.6 counters the cost argument by stating that claims about the cost of de-extinction lack evidence, but everything contained within Document 4, point 6 is, itself, pure speculation. The other arguments in favour of de-extinction are also weak. The claim in Doc 3 that scientists should be free to pursue their interests is simplistic and does not really add anything to the debate. Quite apart from the more sinister implications of scientists being allowed to pursue any interesting project at, presumably, any cost, science has to be funded, often from public money. Those funding the science have a right to be involved in the debate about where it should be spent. The apparent increase in funding for animal projects shown in the upper graph of Doc 5 could be used to support a claim that de-extinction projects have changed US government policy. However, the last two years shown could be unusual, as could the first two. Four years is not enough to be confident about a trend. Indeed, the non-linear nature of the *x*-axis is suspicious. Furthermore, we cannot know the main reasons behind an increase in spending even if it were real.	

Question	Answer	Marks
4	The apparently moral argument about correcting the mistakes of the past is weak also. We have, arguably, more of a moral duty to protect what we have. If we focus on the past we might forget about the present and lose the future. De-extinction is not the answer to our problems.	

Level	Structure	Max 8	Quality of argument	Max 8	Use of documents	Max 8	Treatment of counter positions	Max 6
4	Precise conclusion and accomplished argument structure with consistent use of intermediate conclusions. Likely to include at least two of the following: • strands of reasoning • suppositional reasoning • analogy • evidence • examples Argument is structured so the thought process is made clear. Uses vocabulary of reasoning appropriately and effectively to support argument.	7–8	Cogent and convincing reasoning which answers the question which was asked. Subtle thinking about the issue. Use of relevant own ideas and ideas from documents. Very few significant gaps or flaws.	7–8	Perceptive, relevant and accurate use of documents to support reasoning. References 3+ documents. Sustained and confident evaluation of documents to support reasoning. (Two or more valid **evaluative** references to documents). Able to combine information from two or more documents and draw a precise inference.	7–8	Consideration of key counter arguments and effective response to these. Use of own ideas in response to counter arguments not mentioned in the documents. Use of valid critical tools to respond to counter arguments. Effective use of appropriate terminology.	5–6
3	Clear conclusion that is more than "I agree". Clear argument structure, which may be simple and precise or attempt complexity with some success. Appropriate use of intermediate conclusions. Use of other argument elements to support reasoning. Generally makes thinking clear. Appropriate use of vocabulary of reasoning.	5–6	Effective and persuasive reasoning which answers the question which was asked. (Although there may be some irrelevance or reliance on dubious assumptions.) Use of own ideas and ideas from documents. Few significant gaps or flaws.	5–6	Relevant and accurate use of documents which supports reasoning. References 3+ documents. Some evaluation **and** comparison of documents to support reasoning. Inference drawn from at least 1 document.	5–6	Consideration of key counter arguments and effective response to these. Response uses own ideas or is developed from documents. Some use of appropriate terminology.	3–4

Level	Structure	Max 8	Quality of argument	Max 8	Use of documents	Max 8	Treatment of counter positions	Max 6
2	Conclusion stated but may be "I agree". Sufficient clarity for meaning to be clear throughout. Structure may be easy to follow but brief or a longer argument which has a less clear structure. Uses reasons. Some appropriate use of vocabulary of reasoning.	3–4	A reasoned stance which attempts to answer the question which was asked. Some support for the conclusion. (Although there may be considerable irrelevance or reliance on dubious assumptions.) Some thinking/own ideas about the issue. Use of rhetorical questions and emotive language. Some significant gaps or flaws.	3–4	Some relevant use of documents to support reasoning, but some documents used indiscriminately. Some comparison of documents **or** some critical evaluation of documents **or** reasoned inference drawn from document.	3–4	Inclusion of counter argument or counter assertion. Response is direct but weak or taken entirely from documents.	2
1	Attempt to construct an argument. Unclear conclusion, multiple conclusions or no conclusion. Disjointed, incoherent reasoning. Use of examples in place of reasoning. Possibly a discourse or a rant. Reasons presented with no logical connection. Documents considered sequentially. Substantial irrelevant material.	1–2	Attempt to answer the general thrust of the question. Attempt to support their view. Excessive use of rhetorical questions and emotive language. Ideas which are contradictory.	1–2	Some, perhaps implicit, use of documents. No attempt at critical evaluation. No comparison of documents.	1–2	Inclusion of counter argument or counter assertion. Response is direct but ineffective.	1