

Mark Scheme (Results)

Summer 2015

Pearson Edexcel GCE in Geography
(6GE03)

Unit 3: Contested Planet

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General Guidance on Marking

All candidates must receive the same treatment.

Examiners should look for qualities to reward rather than faults to penalise. This does NOT mean giving credit for incorrect or inadequate answers, but it does mean allowing candidates to be rewarded for answers showing correct application of principles and knowledge.

Examiners should therefore read carefully and consider every response: even if it is not what is expected it may be worthy of credit.

Candidates must make their meaning clear to the examiner to gain the mark. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct context.

Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the Team Leader must be consulted.

Using the mark scheme

The mark scheme gives:

- an idea of the types of response expected
- how individual marks are to be awarded
- the total mark for each question
- examples of responses that should NOT receive credit.

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- show clarity of expression
- construct and present coherent arguments
- demonstrate an effective use of grammar, punctuation and spelling.

Full marks will be awarded if the candidate has demonstrated the above abilities.

Questions where QWC is likely to be particularly important are indicated "QWC" in the mark scheme BUT this does not preclude others.

SECTION A

| Question Number | Indicative content | |
|-----------------|---|---|
| 1a | <p>Figure 1 shows energy use in three countries at different levels of development (LEDC, NIC and MEDC). Answers should provide explanations reasons for the differences in total energy use person, average annual energy growth and different sources of energy:</p> <p>Total energy use per person:</p> <ul style="list-style-type: none"> • Related to income / development level with Ethiopia using less than 1/10th the energy of Sweden. <ul style="list-style-type: none"> • Could argue an agricultural / subsistence economy in Ethiopia versus an industrial / urban society in Sweden. <p>Growth rates:</p> <ul style="list-style-type: none"> • Sweden's is barely growing because of the high level of development already reached, and environmental concerns / efficiency / conservation; growth in China exceeds 10% a year due to rapid industrialisation and development of infrastructure. • Ethiopia's growth rate is also high – probably as a result of rapid urbanisation. <p>Different sources:</p> <ul style="list-style-type: none"> • Ethiopia relies on traditional biomass (dung, wood, crop waste) it is a rural, agricultural economy so much of this will be domestic use and people collect what they can. • Biofuels are also high in Sweden but this is more technologically advanced i.e. biodiesel and bioethanol plus commercial biomass e.g. forestry waste. • Fossil fuel use depends on whether a country has the resources e.g. Chinese coal; Sweden and Ethiopia do not have many resources plus Sweden chooses to use less polluting sources. • Nuclear technology is too advanced for an LEDC and in the other countries might be seen as a political policy decision + green issues (Sweden – also an explanation for Sweden's high renewable use; physical factors (HEP) might be mentioned here also). | |
| Level | Mark | Descriptor |
| Level 1 | 1-4 | A few general comments on some parts of Figure 1 such as energy types in a largely descriptive account, with a few basic explanations. Structure is poor or absent. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors. |

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| Level 2 | 5-7 | Some range of explanations, not all convincing, for some of the differences with some details but unbalanced in relation to Figure 1. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. |
| Level 3 | 8-10 | A range of different explanations across the columns on Figure 1 with some detail, likely to use examples. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare |

| Question Number | Indicative content | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|--|--|----------------------|---------------|---------|---|---|---------|---|-------------------------------|------|--|---|-----|--|--|-------|---|--|------------|--|--|------------|---|--|
| 1b | <p>Answers should focus on both renewable energy sources and recyclable ones (biomass and nuclear). Do not credit reference to conventional and non-conventional fossil fuels.</p> <p>Responses should focus on the degree to which renewable and recyclable sources always have costs for the environment and people when they are developed. Many sources could be discussed including:</p> <p>*Recyclable:</p> <table border="1" data-bbox="357 555 1505 842"> <thead> <tr> <th></th> <th>Environmental</th> <th>Social</th> </tr> </thead> <tbody> <tr> <td>Biomass</td> <td>Question marks over how carbon neutral biofuels actually are across their whole lifecycle; deforestation in tropical areas.</td> <td>Impacts on food prices; quite a large employer.</td> </tr> <tr> <td>Nuclear</td> <td>Range of issues – waste disposal, leaks, disasters.</td> <td>Health impacts, NIMBY issues.</td> </tr> </tbody> </table> <p>*Credit CHP (Combined Heat and Power) as recyclable; it can use waste as an energy source.</p> <p>Renewable:</p> <table border="1" data-bbox="357 949 1505 1883"> <tbody> <tr> <td>Wind</td> <td>Bird strikes, landscape alteration, costs of construction / resources versus low / no CO2 output – might be seen as acceptable especially if offshore.</td> <td>NIMBY issues, property values, noise, stress – might be seen as minor by some (perhaps not to locals)</td> </tr> <tr> <td>HEP</td> <td>Loss of land (deforestation) and possibly biodiversity, high resource use in construction.</td> <td>Displacement of people / loss of homes; lack of benefit from supply to local people.</td> </tr> <tr> <td>Solar</td> <td>Large areas of land, but often of low value (deserts) or already used (roof); environmental footprint costs of making and installing.</td> <td>Very limited impact – might be judged as almost cost free save for reliability issues. Impact of large solar arrays, especially on farmland.</td> </tr> <tr> <td>Geothermal</td> <td>Surface installation has a small footprint and other impacts minimal</td> <td>Virtually none – could be viewed as cheap and clean.</td> </tr> <tr> <td>Wave/Tidal</td> <td>Impact on biodiversity e.g. proposed Severn Barrage mud flats / birds; possibly landscape impacts</td> <td>Larger schemes, especially tidal, tend to have been opposed by environmentalists; wave likely to be smaller, offshore, less controversial.</td> </tr> </tbody> </table> <p>Overall judgement:</p> <ul style="list-style-type: none"> • May conclude that recyclable have more environmental negatives than renewable. | | Environmental | Social | Biomass | Question marks over how carbon neutral biofuels actually are across their whole lifecycle; deforestation in tropical areas. | Impacts on food prices; quite a large employer. | Nuclear | Range of issues – waste disposal, leaks, disasters. | Health impacts, NIMBY issues. | Wind | Bird strikes, landscape alteration, costs of construction / resources versus low / no CO2 output – might be seen as acceptable especially if offshore. | NIMBY issues, property values, noise, stress – might be seen as minor by some (perhaps not to locals) | HEP | Loss of land (deforestation) and possibly biodiversity, high resource use in construction. | Displacement of people / loss of homes; lack of benefit from supply to local people. | Solar | Large areas of land, but often of low value (deserts) or already used (roof); environmental footprint costs of making and installing. | Very limited impact – might be judged as almost cost free save for reliability issues. Impact of large solar arrays, especially on farmland. | Geothermal | Surface installation has a small footprint and other impacts minimal | Virtually none – could be viewed as cheap and clean. | Wave/Tidal | Impact on biodiversity e.g. proposed Severn Barrage mud flats / birds; possibly landscape impacts | Larger schemes, especially tidal, tend to have been opposed by environmentalists; wave likely to be smaller, offshore, less controversial. |
| | Environmental | Social | | | | | | | | | | | | | | | | | | | | | | | |
| Biomass | Question marks over how carbon neutral biofuels actually are across their whole lifecycle; deforestation in tropical areas. | Impacts on food prices; quite a large employer. | | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear | Range of issues – waste disposal, leaks, disasters. | Health impacts, NIMBY issues. | | | | | | | | | | | | | | | | | | | | | | | |
| Wind | Bird strikes, landscape alteration, costs of construction / resources versus low / no CO2 output – might be seen as acceptable especially if offshore. | NIMBY issues, property values, noise, stress – might be seen as minor by some (perhaps not to locals) | | | | | | | | | | | | | | | | | | | | | | | |
| HEP | Loss of land (deforestation) and possibly biodiversity, high resource use in construction. | Displacement of people / loss of homes; lack of benefit from supply to local people. | | | | | | | | | | | | | | | | | | | | | | | |
| Solar | Large areas of land, but often of low value (deserts) or already used (roof); environmental footprint costs of making and installing. | Very limited impact – might be judged as almost cost free save for reliability issues. Impact of large solar arrays, especially on farmland. | | | | | | | | | | | | | | | | | | | | | | | |
| Geothermal | Surface installation has a small footprint and other impacts minimal | Virtually none – could be viewed as cheap and clean. | | | | | | | | | | | | | | | | | | | | | | | |
| Wave/Tidal | Impact on biodiversity e.g. proposed Severn Barrage mud flats / birds; possibly landscape impacts | Larger schemes, especially tidal, tend to have been opposed by environmentalists; wave likely to be smaller, offshore, less controversial. | | | | | | | | | | | | | | | | | | | | | | | |

| | | <ul style="list-style-type: none"> The environmental and social negatives are 'worth it' in the long run, perhaps especially for small scale, local renewable projects. <p>Detailed judgement of one source compared to another e.g. wind versus HEP.</p> |
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| Level | Mark | Descriptor |
| Level 1 | 1-4 | Describes some types of appropriate resources and some general impacts but lacks an environmental / social focus. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors. |
| Level 2 | 5-8 | Outlines some range of costs for some appropriate resources (renewable / recyclable not differentiated) but lacks detail and examples; no assessment of extent. Structure is satisfactory. Some explanations, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. |
| Level 3 | 9-12 | Some detailed social and environmental costs for a range of renewable and recyclable sources using examples with some attempt to judge extent. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare. Max 10 if only recyclable or renewable. |
| Level 4 | 13-15 | Detailed, supported answer which considers the extent to which social and environmental costs always occur for both types of energy resource and makes a judgement on costs versus benefits. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare. |

| Question Number | Indicative content | |
|-----------------|---|---|
| 2a | <p>Figure 2 shows 4 different options for increasing water supply which are indicated as more or less desirable. Answers should explain the ordering, but stronger answers may also question it.</p> <p>Water conservation</p> <ul style="list-style-type: none"> Does not actually increase supply, but makes water go further so shortages / insecurity are reduced; makes no further demand on supplies so possibly viewed as most sustainable (no new infrastructure, impact of biodiversity, additional extraction). May be difficult to implement as it needs a change of attitude. Singapore might be mentioned as an example. <p>Recycling waste</p> <p>Using grey water for crops or flushing; effectively uses water twice so is more efficient; some people may be put off by this idea (unhygienic etc) and it might require re-plumbing or other adaptations but is 'green' as it is a type of recycling.</p> <ul style="list-style-type: none"> As with water conservation, might be argued as cheaper / low cost. <p>Groundwater extraction</p> <ul style="list-style-type: none"> Could be viewed as being quite desirable as long as it is done in a renewable way so extraction balances recharge (some might argue that it is very desirable on this basis). There are problems with over-extraction lowering water tables, leading to subsidence and even issues such as arsenicosis; salinization of coastal aquifers. <p>Desalinisation</p> <ul style="list-style-type: none"> Energy intensive e.g. using fossil fuels to power desalination plants in the Middle East (emissions) and it tends to be used where population already exceeds water supply so is not seen as sustainable long-term May have an impact on ecosystems as large volumes of salt need to be disposed of. High cost of water to consumers, so can't be afforded by some (economic water scarcity). | |
| Level | Mark | Descriptor |
| Level 1 | 1-4 | A few general comments on the impacts of some of the options, narrow and lacking detail. Structure is poor or absent. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors. |
| Level 2 | 5-7 | A range of explanations and attempts to justify the order with reference to some impacts with some details. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. |
| Level 3 | 8-10 | Detailed explanation of the order with references to the pros and cons across the options, may question the order and likely to use examples. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare |

| Question Number | Indicative content | |
|-----------------|---|--|
| 2b | <p>Answers should focus on transboundary water sources i.e. where water is shared across an international or internal political boundary. Answers should use transboundary examples to judge whether the water sources can be shared or whether conflict is inevitable.</p> <p>The background internationally is the The Helsinki Rules on the Uses of the Waters of International Rivers and the 2004 Berlin Rules on Water Resources which provide a framework to reach agreement which is sometimes followed.</p> <p>A range of transboundary situations can lead to conflict:</p> <ul style="list-style-type: none"> • Where water is transferred from one region to another e.g. China south-north diversion or diversion in Spain, or on the Colorado and one or more parties feel they lose out. • Conflict might emerge over environmental issues where water extraction exceeds renewable levels. <p>When there are different players that all want to use to use the same water resource, conflict is more likely.</p> <ul style="list-style-type: none"> • Pollution of water supplies can bring one user into conflict with another i.e. pollution being sent downstream, as in the Ganges. <p>Internationally there are many examples where several nations place conflicting demands on the same water resource:</p> <ul style="list-style-type: none"> • Mekong River (China and other countries: upper and lower reaches users) • Turkey GAP Project • River Nile (Egypt, Sudan, Ethiopia and others) • River Jordan and aquifers in Israel / Palestine • Ganges (Bangladesh and India) <p>Internally:</p> <ul style="list-style-type: none"> • The Colorado River (US states, but also Mexico adding an international dimension) • Northern versus Southern California. <p>Overall judgement:</p> <ul style="list-style-type: none"> • Candidates should argue, as part of their assessment, that conflict is not inevitable and that agreement can be reached locally or internationally over transboundary sources e.g. the Mekong River Commission or on the Colorado. • International situations are often more troublesome than internal boundaries. • Conflict is more likely in areas of existing water stress • Conflict is more likely when there are other political disagreements, not just water. | |
| Level | Mark | Descriptor |
| Level 1 | 1-4 | A few general ideas on conflict in a one-sided account lacking accurate use of examples. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors. |

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| Level 2 | 5-8 | Outlines a range of situations where conflict exists and explains why, with some details, but lacks assessment. Structure is satisfactory. Some explanations, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. |
| Level 3 | 9-12 | Some assessment in an account which explains a range of situations where conflict exists, using examples. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare. |
| Level 4 | 13- 15 | Genuine assessment which considers both sides in detail using examples and takes an overview. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare. |

| Question Number | Indicative content | |
|-----------------|---|---|
| 3a | <p>Figure 3 shows 3 ways of measuring status; countries referred to are a mixture of existing, former and rising powers. Answers should refer to Fig 3 and could also bring in their own ideas of suitable / unsuitable measures. The commentary should make some judgement about the value / usefulness of the measures shown and possibly others.</p> <p>Military spending</p> <ul style="list-style-type: none"> • Might be seen as ranking the countries in the 'right' way i.e. USA well ahead (reference to its hyper-power status might be made) followed by China and Russia (2 of the BRICs) with the UK in 4th. • Hard power: importance of deterrence; importance of superpowers projecting themselves globally; ability to act globally to protect interests e.g. trade routes. • The USA's very large spend might be related to its global reach (navy, air force) which no other country can match. • All 4 countries are nuclear powers which might be seen as putting them in the 'global powers' club. • Similar ranking to military, but the differences are smaller with the USA just ahead of China; this could be seen as reflecting a country's ability to invest in sport, desire to be seen on the global stage as successful – or just population size (note no India in the top 4). • It could also be seen as reflecting cultural influence (soft power) but might be argued as actually not very useful (position of the UK – home advantage, investment before the games, but not much global power). <p>Patent applications</p> <ul style="list-style-type: none"> • Reflect education / skill levels, R&D spending, innovation and the research work of TNCs – might be seen as a key economic indicator bringing power through profit. • Some might argue this shows economic and technological prowess is not enough to make a country globally powerful (Korea, Japan). • Possible comments on the low quality of Chinese patent applications i.e. not genuinely innovative. <p>Many other measures might be mentioned (IGO membership, wealth per capita, number of TNCs etc) or the idea that an index could be devised using several measures to iron out anomalies.</p> | |
| Level | Mark | Descriptor |
| Level 1 | 1-4 | Descriptive response with one or two comments relating to the data and what it shows. Structure is poor or absent. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors. |
| Level 2 | 5-7 | Some comments on the value of the data with some explanation of what it shows / its usefulness with some details. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. Max 7 if only two ways. |

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| Level 3 | 8-10 | Detailed commentary on the value of the data, and shows understanding of its usefulness and limitations; may refer to other data. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare |
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| Question Number | Indicative content | |
|-----------------|---|--|
| 3b | <p>Answers need to focus on the BRICs and countries in the developing world i.e. not OECD countries.</p> <p>Threats</p> <ul style="list-style-type: none"> • The rise of China and India especially might be seen as an environmental threat as China is already the largest CO2 emitter – climate change could threaten Sub-Saharan Africa and states vulnerable to sea level rise. • Aid levels could fall as traditional powers give less but emerging powers do not fill the gap as they have little tradition of aid giving. • There might be new aid (a positive) but it could be tied in the same way as aid in the past. • Land-grabs might be considered, either as exploitative or as a relatively easy way for developing countries to earn money. • New neo-colonial relations might just replace older ones e.g. China’s role in Africa could be seen as either exploitation or a new relationship based on trade rather than muddled by old colonial ties. • Specific threats to political stability e.g. Russian destabilising influence, or tensions on the South China Sea. <p>Opportunities</p> <ul style="list-style-type: none"> • Some BRICs might provide regional leadership and help give developing regions greater power / say in world affairs e.g. the role of Brazil in Latin America. • The BRICs are a huge market for exports, especially food and raw materials – a possible alternative to markets in the EU and North America with their trade blocs. • BRICs will invest in developing countries perhaps without ‘western’ ideas of what development should be so countries are freed from former colonial relationships. • As the BRICs gain more power in IGOs this might eventually give the wider ‘south’ a greater say in international relations. <p>Overall judgement:</p> <ul style="list-style-type: none"> • A summative statement judging benefits versus opportunities. • Differentiating between, for instance environmental threats due to rampant global pollution versus economic opportunities. • Ideas about LEDCs / RICs gaining while the poorest countries i.e. LDCs remain in a poverty trap. <p>NB: Developed countries focus is a rubric, but credit relevant general threats / opportunities up to Max 6.</p> | |
| Level | Mark | Descriptor |
| Level 1 | 1-4 | One or two general ideas likely to focus on one issue only e.g. China’s role in Africa. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors. |
| Level 2 | 5-8 | Some explanation of some threats and / or opportunities in general terms lacks detail and assessment. Structure is satisfactory. Some explanations, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. |

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| Level 3 | 9-12 | Some assessment in an account which explains a range of threats and opportunities, with some details and use of examples but unbalanced. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare. |
| Level 4 | 13- 15 | Detailed assessment of both threats and opportunities with good use of examples, likely to take an overall judgement. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare. |

| Question Number | Indicative content | |
|-----------------|---|--|
| 4a | <p>The data shows the average % of poverty in Vietnam and its trend, as well as ethnic minority and majority groups, and rural versus urban people. Explanations should focus on both the trends and the differences in poverty levels.</p> <p>Differences in levels of poverty:</p> <ul style="list-style-type: none"> Compared to the Vietnam average the ethnic Vietnamese majority have slightly lower poverty levels, by about 5%; the ethnic minority groups have greater poverty levels by about 30-40% - this difference might be taken to indicate discrimination e.g. in the jobs market or education opportunities. The map indicates that ethnic minority populations tend to be peripheral, they have the highest poverty levels but also a steep decline; they live inland and away from major cities; some might conclude they are a poorer, rural population Rural areas have higher poverty than average, and considerably higher than urban areas – explanations might include isolation, rural poverty, subsistence farming, lack of job opportunities in rural areas (+ the impact of the high proportion of ethnic minorities. Urban areas have the least poverty – jobs in industry and trade (coastal) and better incomes could be explanations <p>Trends in poverty:</p> <ul style="list-style-type: none"> In terms of trends, poverty has been almost eliminated in urban areas 1994-2006 because of economic development and new job opportunities e.g. factories, tourism. Rural development might be used to explain the fall in poverty here, although some candidates might note that the gap between ethnic minority poverty and the Vietnam average actually increases over the period – evidence of continued or even increased discrimination / opportunities for this group. | |
| Level | Mark | Descriptor |
| Level 1 | 1-4 | Descriptive response which recognises the differences and / or trends but provides one or two basic reasons for these. Structure is poor or absent. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors. |
| Level 2 | 5-7 | Response provides some reasons but less detail and unbalanced in terms of trends and differences. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. |
| Level 3 | 8-10 | Response provides a range of detailed and plausible reasons for both the differences and trends, using own knowledge. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare. |

| Question Number | Indicative content | |
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| 4b | <p>Answers need to focus on whether economic development can happen whilst benefitting everyone and not harming the environment or whether these are mutually exclusive.</p> <p>Much will depend on the exact examples chosen but the following points might be made:</p> <ul style="list-style-type: none"> • Development often leads to environmental degradation e.g. in China where water and air pollution levels are high. Poverty reduction (200+ million lifted out of poverty since the mid 90s) has improved social conditions and incomes but at the expense of the environment. • Alternatively, the first-generation NICs such as Taiwan, South Korea and Singapore have now moved to clean up their environment – this might be related to the Kuznet’s curve idea that when a certain level of economic development is achieved concern for the environment grows. • Urbanisation might be seen as promoting the growth of slums e.g. Dharavi or Kibera which have poor environmental conditions and low quality of life. <p>Brazil’s biofuel programme, or even Curitiba, might be viewed as evidence the development does not have to degrade the environment and can be sustainable.</p> <ul style="list-style-type: none"> • Examples could come from the developed world e.g. Canada’s development of tar sands brings significant economic gains but at the expense of ecosystems. • Development might be seen as promoting social inequality e.g. the development of a coastal and urban core in China and a poor rural periphery. • In NICs and RICs development can bring exploitation and poor working conditions in factories (FTZs, EPZs) which also contribute to low environmental quality. <p>Overall judgement: From better answers expect an overall judgment such as that the environment usually suffers but the social judgment is more complex.</p> | |
| Level | Mark | Descriptor |
| 1 | 1-4 | A few general ideas on development and its impact, narrow and negative. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors. |
| 2 | 5-8 | Some explanation of the social and environmental impacts of development but one-sided and lacking detail. Structure is satisfactory. Some explanations, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. |

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| 3 | 9-12 | Some assessment of the social, economic and environmental consequences of development with some details and balance; some use of examples. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare. |
| 4 | 13-15 | Genuine assessment of how far economic gains outweigh other consequences; recognises the complexity of the debate with detailed use of examples. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare. |

| Question Number | Indicative content | |
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| 5a | <p>The 3 views shown differ in viewpoint; Kurzweil is essentially positive / optimistic whereas Lovins is pessimistic (even technophobic). Kranzberg warns that technology will always have some consequences but is 'neutral' in terms of what these might be.</p> <p>Possible evidence that might be used to support their viewpoints includes:</p> <p>Kurzweil:</p> <ul style="list-style-type: none"> • 'Futurist' might be interpreted as very optimistic. • Answers might focus on the disease part of the quote and discuss how medical technology has helped overcome diseases such as Aids/ HIV by prolonging life (use of ARVs) in the last few decades when in the past the disease was seen as unbeatable. • Geo-engineering technology could be seen as a future technology that could combat the environmental problem of global warming, perhaps combined with renewable energy technology to reduce emissions. • Poverty reduction technologies could include intermediate technology to increase food and water supply, or hi-tech approaches like GM. <p>Lovins:</p> <ul style="list-style-type: none"> • 'Environmental scientist' might be seen as focussing on environmental costs. • In support of Lovins, answers might focus on fossil fuels to argue that humans have already caused a global warming pollution crisis so that if humans discovered another similar source they would cause environmental disaster again; even if the source was 'clean' it might encourage resource consumption in other ways. • Some answers could argue that humans have actually developed a range of clean energy sources so the problem is not the technology but how humans choose to use it <p>Kranzberg:</p> <ul style="list-style-type: none"> • 'Historian' and therefore possibly taking a more balanced view? • This view might be exemplified with respect to technologies that have unforeseen consequences such as DDT – positive impact on pests, but longer term a disastrous impact on ecosystems. • Other examples with (potentially) similar impacts might be GM and the Green Revolution; even mobiles phones with their social impacts or even political impacts. | |
| Level | Mark | Descriptor |
| Level 1 | 1-4 | One or two ideas about some of the viewpoints, but lacks detail and clarity. Structure is poor or absent. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors. |
| Level 2 | 5-7 | Suggests a range of reasons with some details and uses some examples of technology to illustrate the viewpoints. Structure is satisfactory. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. Max 7 if only two viewpoints. |

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| Level 3 | 8-10 | The response suggests a range of reasons for all three views and there is detailed use of examples of technology in support; may challenge some of the views. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare. |
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| Question Number | Indicative content | |
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| 5b | <p>Answers need to consider the technology gap, and might take the approach of evidence for it narrowing versus evidence for it widening. The nature of the gap depends on which technologies are examined e.g. electricity access versus broadband internet etc.</p> <ul style="list-style-type: none"> • Very broadly speaking the N-S divide still holds in terms of incomes so it might be expected that technology follows this pattern. • The gap might be seen as even starker than the N-S divide suggests on the basis of patents and royalties i.e. technological innovation and its benefits. • Technology transfers have taken place e.g. cheap ARV drugs to help the Aids / HIV crisis in Africa and the widespread use of malaria nets – although these could be seen as just aid rather than genuinely reducing the gap. • Technological leapfrogging has made some technologies – particularly mobile phones, ubiquitous in many parts of the developing world although better answers will note that this does not extend to other technologies (internet, PCs, health care) There are still very large gaps, especially in rural sub-Saharan Africa and parts of rural Asia where basic technologies like piped water and electricity barely exist so the gap is still very large. • Accept arguments that in some places – North Korea, Middle East (females), the gap is ‘artificially’ enforced by politics and / or culture. • Stronger answers might argue that there is a gap but that the North-South divide is not really the right ‘model’ to use, and that it is more regional (i.e. Africa) or based on gender, or rural / urban differences. <p>Overall judgement:</p> <ul style="list-style-type: none"> • May take the view that rapid NIC development has made the pattern much more complex; could argue for a spectrum of technology access • Could consider Africa as ‘left behind’ i.e. the remaining ‘south’ or take a more sophisticated view of rural areas in developing countries being left behind but urban areas have bridged the gap. • Could also contrast some widespread technologies (mobiles) with ones that are much less available to all (medical). | |
| Level | Mark | Descriptor |
| Level 1 | 1-4 | One or two general ideas on the technology gap in a descriptive account, simplistic viewpoint. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors. |
| Level 2 | 5-8 | Explains some aspects of the distribution of technology globally but one-sided e.g. leapfrogging. Structure is satisfactory. Some explanations, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. |

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| Level 3 | 9-12 | Some attempt to judge the extent with some details and use of examples, sees more than one viewpoint. Structure is good. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare. |
| Level 4 | 13-15 | Detailed answer using examples which considers the extent of the technology gap with evidence for and against. Carefully structured. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare. |

SECTION B

| Question Number | Indicative content | |
|-----------------|---|---|
| 6a | <p>Responses could be structured in a number of ways such as local versus global value, or economic, socio-cultural and ecological / environmental value. Goods and services could also be used, or regulating, provisioning, supporting and cultural services. Whichever is used, people and planet need to be addressed.</p> <p>Value to people (mostly ecological resources):</p> <ul style="list-style-type: none"> • Home to about 40 different indigenous groups, numbering around 400,000; Arctic people still depend directly on the areas ecosystems for their livelihood, at least in part. • Cultural value in terms of spiritual / religious significance. • Value as a pristine wilderness in its own right, but also as a place to visit and see nature 'in the raw'. • Various types of economic value e.g. fishing, raw materials such as timber. <p>NB The question focuses on <i>ecological</i> resources, so do not credit minerals or fossil fuels.</p> <p>Value to the planet (mostly physical systems):</p> <p>The Arctic is a store of biodiversity, and although this is lower than in some regions it does have a high percentage of some life forms notably lichens (10% - see Fig 3) mosses and springtails; valuable area in terms of migration and breeding especially for birds. View 1.</p> <ul style="list-style-type: none"> • Value as a carbon sink, locking away CO₂ and methane in permafrost as un-decomposed dead organic matter (peat) which if released could have a serious impact on the greenhouse effect; the extreme cold climate in the physical systems that makes this possible. • Boreal forests as a carbon sink and therefore climate regulation. • Value as a 'global refrigerator' as the Arctic has a cooling effect on the whole planet via the albedo effect and its contributing of cold water to the thermohaline circulation. View 5. <p>Stronger answers might take an evaluative approach and take an overview as to which of the many 'values' is the most significant.</p> <p>Synoptic linkages Unit 1 – Arctic CCS Unit 1 – Climate change Unit 3 - Energy Unit 4 – Cultural geography and cold environments.</p> | |
| Level | Mark | Descriptor |
| Level 1 | 1-4 | Some general ideas on value but narrow e.g. economic value of resources; lacks careful use of the resource booklet. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors. |

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| Level 2 | 5-8 | Some details in a response that explains the value of ecological resources and physical systems but may not differentiate clearly; some reference to people and planet but unbalanced. Structure is satisfactory. May refer to wider links. Some explanations, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. |
| Level 3 | 9-12 | Detailed explanation using the resources and own knowledge / wider links. Value of both ecological resources and physical systems related to people and planet. May take an overview of value. Structure is good. Explanations are always clear. Synoptic. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare. |

| Question Number | Indicative content | | | | | | |
|---|--|---|--|---|--|--|--|
| 6b | <p>Some reference might be made to Fig 5 which shows that some ecosystems present in the Arctic are more threatened than other i.e. marine by over-exploitation (high and rising), all by pollution and climate change (especially polar). Better answers need to do more than just explain the threats; they need to consider which are the most important. Threats will be considered in a general way but better answers need to make reference to <i>biodiversity and the environment</i>:</p> <table border="1" data-bbox="300 551 1533 1727"> <tbody> <tr> <td data-bbox="300 551 914 981"> <p style="text-align: center;">Overfishing</p> <p>Might argue the threat is not very clear as the data is not good; even the upper level of 950,000 in total 1950-2006 is small compared to other fisheries (Fig 6), but with warming seas / longer seasons it could quickly get out of control and damage food chains (Fig 4) or collapse (Fig 6); not very commercial now but pressure could build as other stocks decline further e.g. Northeast cod. View 3.</p> </td> <td data-bbox="914 551 1533 981"> <p style="text-align: center;">Climate change</p> <p>Might be considered to be the most serious threat warming is already twice as fast as the global average and expected to continue – plus it is happening now with direct impacts on biodiversity e.g. polar bears via sea ice melt, boreal forests via pests and fires; potential to hugely effect migration and breeding; some might see it as a ‘context threat’. View 2. Figure 8 details should be used.</p> </td> </tr> <tr> <td data-bbox="300 981 914 1373"> <p style="text-align: center;">Tourism</p> <p>Relatively small and like Antarctica mostly via ship; but as summers lengthen it could increase rapidly and the Arctic is much more accessible to European and North American consumers compared to the Antarctic – however it can be carefully managed so might not be seen as much of a direct threat to biodiversity.</p> </td> <td data-bbox="914 981 1533 1373"> <p style="text-align: center;">Shipping</p> <p>Limited at the moment, but projected to rise quickly – its impact on biodiversity is likely to be indirect via pollution and could be small (soot could reduce albedo further, dumping from ships) – contributes to GHG emissions and is actually a result of the GW threat and ice melting. Oil spill etc risk high due to hazardous shipping route</p> </td> </tr> <tr> <td data-bbox="300 1373 914 1727"> <p style="text-align: center;">Resource extraction</p> <p>Potentially has a large impact because it directly scars the landscape and destroys ecosystems (although it is a vast wilderness) e.g. on Baffin Island; risk of oil spills from drilling – the North Slope, ANWR and tar sands might all get a synoptic mention.</p> </td> <td data-bbox="914 1373 1533 1727"> <p style="text-align: center;">Other threats to biodiversity including:</p> <p>Invasive species; pests and disease outbreaks. Habitat destruction from permafrost melt, resource extraction. Conflict: not directly effecting biodiversity but if the Arctic does become a ‘free for all’ it could herald a future of exploitation. View 4.</p> </td> </tr> </tbody> </table> <p>Synoptic linkages Unit 3 – energy, Unit 1 – climate change, Unit 1 – Arctic CCS Research: threats such as pollution (PCBs etc) entering the Arctic food chain.</p> <p>Overall judgement: Should be present at the top end, will depend on argument. Scale / wide ranging nature of climate change, versus more local threats. Immediate nature of some threats versus longer term for others. Degree of manageability of the threats.</p> | <p style="text-align: center;">Overfishing</p> <p>Might argue the threat is not very clear as the data is not good; even the upper level of 950,000 in total 1950-2006 is small compared to other fisheries (Fig 6), but with warming seas / longer seasons it could quickly get out of control and damage food chains (Fig 4) or collapse (Fig 6); not very commercial now but pressure could build as other stocks decline further e.g. Northeast cod. View 3.</p> | <p style="text-align: center;">Climate change</p> <p>Might be considered to be the most serious threat warming is already twice as fast as the global average and expected to continue – plus it is happening now with direct impacts on biodiversity e.g. polar bears via sea ice melt, boreal forests via pests and fires; potential to hugely effect migration and breeding; some might see it as a ‘context threat’. View 2. Figure 8 details should be used.</p> | <p style="text-align: center;">Tourism</p> <p>Relatively small and like Antarctica mostly via ship; but as summers lengthen it could increase rapidly and the Arctic is much more accessible to European and North American consumers compared to the Antarctic – however it can be carefully managed so might not be seen as much of a direct threat to biodiversity.</p> | <p style="text-align: center;">Shipping</p> <p>Limited at the moment, but projected to rise quickly – its impact on biodiversity is likely to be indirect via pollution and could be small (soot could reduce albedo further, dumping from ships) – contributes to GHG emissions and is actually a result of the GW threat and ice melting. Oil spill etc risk high due to hazardous shipping route</p> | <p style="text-align: center;">Resource extraction</p> <p>Potentially has a large impact because it directly scars the landscape and destroys ecosystems (although it is a vast wilderness) e.g. on Baffin Island; risk of oil spills from drilling – the North Slope, ANWR and tar sands might all get a synoptic mention.</p> | <p style="text-align: center;">Other threats to biodiversity including:</p> <p>Invasive species; pests and disease outbreaks. Habitat destruction from permafrost melt, resource extraction. Conflict: not directly effecting biodiversity but if the Arctic does become a ‘free for all’ it could herald a future of exploitation. View 4.</p> |
| <p style="text-align: center;">Overfishing</p> <p>Might argue the threat is not very clear as the data is not good; even the upper level of 950,000 in total 1950-2006 is small compared to other fisheries (Fig 6), but with warming seas / longer seasons it could quickly get out of control and damage food chains (Fig 4) or collapse (Fig 6); not very commercial now but pressure could build as other stocks decline further e.g. Northeast cod. View 3.</p> | <p style="text-align: center;">Climate change</p> <p>Might be considered to be the most serious threat warming is already twice as fast as the global average and expected to continue – plus it is happening now with direct impacts on biodiversity e.g. polar bears via sea ice melt, boreal forests via pests and fires; potential to hugely effect migration and breeding; some might see it as a ‘context threat’. View 2. Figure 8 details should be used.</p> | | | | | | |
| <p style="text-align: center;">Tourism</p> <p>Relatively small and like Antarctica mostly via ship; but as summers lengthen it could increase rapidly and the Arctic is much more accessible to European and North American consumers compared to the Antarctic – however it can be carefully managed so might not be seen as much of a direct threat to biodiversity.</p> | <p style="text-align: center;">Shipping</p> <p>Limited at the moment, but projected to rise quickly – its impact on biodiversity is likely to be indirect via pollution and could be small (soot could reduce albedo further, dumping from ships) – contributes to GHG emissions and is actually a result of the GW threat and ice melting. Oil spill etc risk high due to hazardous shipping route</p> | | | | | | |
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| Level | Mark | Descriptor |
|---------|-------|--|
| Level 1 | 1-4 | Describes some of the threats in general terms; narrow and not linked to environment / biodiversity. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors. |
| Level 2 | 5-8 | Some explanation of threats to environment / biodiversity but in general terms and lacks evaluation of their relative importance. Structure is satisfactory. Some explanations, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. |
| Level 3 | 9-12 | Explanation of a range of threats, with some links to environment / biodiversity and begins to consider relative importance. Structure is good. Some reference to wider links. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are rare. |
| Level 4 | 13-16 | Detailed evaluation of a range of threats and consideration of their relative importance, linked to environment / biodiversity. Carefully structured. Good synoptic links. Explanations are always clear. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare. |

| Question Number | Indicative content | | |
|-----------------|---|--|--|
| 6c | <p>Answers should consider the 3 options. Strengths and weaknesses could be considered from a number of standpoints i.e. in relation to biodiversity, protecting the Arctic generally or from an economic viewpoint – the views of different players might be considered.</p> | | |
| | | Strengths | Weaknesses |
| | 1. Business as usual | <ul style="list-style-type: none"> • Could be argued that it allows the regions vital resources to be exploited so benefiting consumers (energy resources, cheaper consumer goods via shipping) • Possibility that national governments will stick to the protection measures they put in place whereas any international agreements are hard to monitor and police. | <ul style="list-style-type: none"> • Might be argued as the least likely to protect the Arctic's fragile environment although the USA has a strong system of national parks and 11% of Arctic land is protected now. • High likelihood that the area quickly opens up to exploitation, which could quickly lead to conflict. • Various international conventions such as MARPOL and UNCLOS might be seen as fairly toothless. |
| | 2. Arctic framework | <ul style="list-style-type: none"> • As a forum, the Arctic Council allows its members to discuss and reach agreement and it does involve indigenous people. • This cooperative approach might be seen as the best way to manage the region (rather than treaties etc that some don't sign up to e.g. Kyoto) | <ul style="list-style-type: none"> • Strengthening the Arctic Council into a treaty based organisation might work, but it could scare off some member and lead to a lack of agreement • Currently there is no sanction against activities that go against the spirit of the council. |
| | 3. Arctic global sanctuary | <ul style="list-style-type: none"> • Probably the best way to protect the Arctic, but it only deals with areas that are currently not territorial. • It might be possible to get agreement on this as it is the most hostile and remote area of the Arctic at present – on the other and View 5 suggests this is unlikely. | <ul style="list-style-type: none"> • The actual sanctuary area is small – it would not prevent mining and drilling in most areas and would not protect and land areas. • Some might argue that the proposal is not really like the Antarctic Treaty at all in that only an area of open ocean is protected. |

| | <p><u>Synoptic linkages</u></p> <ul style="list-style-type: none"> • Unit 3 Biodiversity management • Research into Antarctica • Links to the MEA scenarios. <p><u>Overall judgement:</u> Should be present at the top end, will depend on argument and the quality of this i.e. realistic judgement. May come up with their own / hybrid management approach.</p> | |
|---------|---|--|
| Level | Mark | Descriptor |
| Level 1 | 1-4 | A few general ideas on some of the approaches but does not consider strengths and weaknesses. Structure is poor or absent. Explanations are over simplified and lack clarity. Geographical terminology is rarely used with accuracy. There are frequent grammar, punctuation and spelling errors. Max 4 if only one approach is considered. |
| Level 2 | 5-8 | Explains a range of strengths and weaknesses with some assessment. Structure is satisfactory. Some reference to wider links. Some explanations, but there are areas of less clarity. Geographical terminology is used with some accuracy. There are some grammar, punctuation and spelling errors. Max 8 if only two approaches are considered. |
| Level 3 | 9-12 | Detailed assessment of the three approaches using information from the booklet and own knowledge; takes an overview. Structure is good. Explanations are always clear. Synoptic. Geographical terminology is used with accuracy. Grammar, punctuation and spelling errors are very rare. |

