



GEOGRAPHY ADMISSIONS ASSESSMENT

CONTENT SPECIFICATION

2017

Overview

The purpose of the Geography Admissions Assessment is to determine a candidate's potential to achieve in an academically demanding undergraduate degree course. The assessment is designed to be challenging, in order to differentiate effectively between able applicants, including those who may have achieved the highest possible grades in school examinations.

The assessment will take two hours and consists of two sections:

Section 1

Section 1 is a multiple-choice assessment consisting of two parts:

Part 1 – Thinking Skills assesses two kinds of skills:

Critical Thinking – reasoning using everyday written language.

Problem Solving – reasoning using numerical and spatial skills.

Part 2 – Reading Comprehension assesses the ability to understand and draw meaning from texts.

1 hour 20 minutes is allowed for Section 1 and candidates are advised to divide their time equally between the two parts of the section.

Section 2

Section 2 requires candidates to produce a written response to a graphical stimulus. Answers should describe, explain, and critique the information presented, as well as considering its wider implications.

40 minutes is allowed for this section of the assessment.

Calculators and dictionaries may **not** be used in any part of this assessment.

Section 1

Section 1 consists of two parts, Thinking Skills and Reading Comprehension.

All questions are multiple choice in format and each correct answer will score 1 mark. No marks are deducted for incorrect answers. The marks for each part – Thinking Skills and Reading Comprehension – will be equally weighted and reported as separate totals. Candidates are advised to split their time equally between the parts, devoting approximately 40 minutes to each.

Part 1: Thinking Skills

Part 1 will have both Critical Thinking and Problem Solving multiple-choice questions. In each case a stimulus is presented, followed by the question and five options. One of the options is the correct answer and the remaining four options are incorrect.

The skill of Critical Thinking is essential to any academic study and often involves considering an argument put forward to promote or defend a particular point of view. It is important in higher education to understand the arguments presented by others and to be able to assess whether the arguments establish their claims.

The skill of Problem Solving is important as many problems encountered in academic and professional work are novel and no ready 'off the peg' solution is available. The task is to find or create a solution using the information available.

In the case of the Critical Thinking questions, the stimulus is a passage of text, often one which puts forward an argument to promote or defend a particular point of view. In Problem Solving questions the stimulus may include a diagram, a table of information or a graph. The multiple-choice options may also be graphs or diagrams.

For a list of the numerical skills required for Problem Solving questions, please see **Appendix 2: The mathematical knowledge and skills needed for Problem Solving.**

Critical Thinking

Critical Thinking involves reasoning using everyday written language. Questions focus on the skills involved in understanding and evaluating arguments. These include: summarising conclusions, identifying assumptions, assessing the impact of additional evidence, detecting reasoning errors and applying principles. On the pages that follow, you will find one example of each of the five Critical Thinking question types in the assessment.

Example 1: Summarising the Main Conclusion

In this type of question you have to judge which one of the statements A to E best expresses the main conclusion of the argument. So the important first step is to read the passage carefully and pick out the sentence which is the conclusion. Remember that the conclusion can appear anywhere within an argument, not necessarily at the end. Remember also that what you are looking for is the statement which follows from or is supported by the rest of the passage.

Vegetarian food can be healthier than a traditional diet. Research has shown that vegetarians are less likely to suffer from heart disease and obesity than meat eaters. Concern has been expressed that vegetarians do not get enough protein in their diet but it has been demonstrated that, by selecting foods carefully, vegetarians are able to amply meet their needs in this respect.

Which one of the following best expresses the main conclusion of the above argument?

- A** A vegetarian diet can be better for health than a traditional diet.
- B** Adequate protein is available from a vegetarian diet.
- C** A traditional diet is very high in protein.
- D** A balanced diet is more important for health than any particular food.
- E** Vegetarians are unlikely to suffer from heart disease and obesity.

A passage may have an intermediate conclusion which is just one of the steps in the reasoning towards the main conclusion. Be careful to check this. If a sentence appears to be a conclusion, but is used as a reason to support some other statement in the passage, then it will not be the main conclusion. Do not worry about whether the information in the passage is true. Just ask yourself: 'If these reasons were true, would they give me good reason to accept the sentence I have identified as the main conclusion?'

What does this argument seem to be trying to get you to accept? It seems to be trying to persuade you that vegetarian food can be healthier than a traditional diet (the first sentence). If you think this is the main conclusion, you should then check whether the rest of the passage gives you reason to believe this. Two reasons are given:

- (i) Vegetarians are less likely to suffer from heart disease and obesity than meat eaters.
- (ii) A vegetarian diet can contain sufficient protein.

You may not know whether these reasons are true but, if they were true, they would indicate that vegetarian food is healthier in one respect than a diet which includes meat, and that a vegetarian

diet does not necessarily have the disadvantage to health (providing insufficient protein) which some may think. So it seems clear that the first sentence of the passage is being offered as a conclusion. **A** is the correct answer.

Example 2: Identifying an Assumption

Questions of this type ask you to identify an assumption in an argument. An assumption is something which is not stated in the argument but which is taken for granted in order to draw the conclusion. So you need first to identify the conclusion of the argument. Then look for the reasoning it gives to support this conclusion, and think about any important point which is not actually stated in the reasoning.

People who write books revealing the inner workings of the secret service have usually been dismissed from the service or have retired with a sense of grievance against it. The result is that only the seedy side of the secret service is exposed. This is partly because those who would paint a more favourable picture are unwilling to flout the legal restrictions placed on all who have been employed in the secret service, and partly because the records of the organisations are not available to outsiders.

Which one of the following is an underlying assumption of the above argument?

- A** The records of the secret service are readily available to its former employees.
- B** The work of the secret service is undervalued as a result of publication of distorted accounts of its working.
- C** The seedy side of the secret service is of minor significance compared with the important work it carries out.
- D** Legal restrictions against revealing the inner workings of the secret service do not apply to those who have been dismissed.
- E** Those who have a grievance against the secret service are either unable or unwilling to give a balanced account of its workings.

The answer to this question is **E**. The conclusion is that only the seedy side of the secret service is exposed. The reasons given for this are that:

- (i) the records of the secret service are not generally available;
- (ii) there are legal restrictions on employees of the secret service which forbid them from writing about it;
- (iii) the only employees or ex-employees who would ignore this restriction are those with a sense of grievance against the secret service.

From these reasons, it would not follow that only the seedy side of the secret service was exposed if those with a grievance were able and willing to give a balanced account. So it must be assumed that either they are not able or they are not willing to do so.

A is not assumed. The passage says that the records are not available to outsiders. But ex-employees may or may not have access to records. We do not need to assume that they do have access in order to conclude that, when they write about the secret service, they reveal only its seedy side.

B is not assumed, because it goes further than the passage. It considers the effects of publications about the secret service. But what we are looking for as an assumption is something which helps to support the conclusion of the passage.

C is not assumed, because the passage says nothing about the importance of the work carried out by the secret service. It does suggest that there is another side to the secret service, besides the seedy side, but no assumptions can be made about which is more important.

D is not assumed, because the passage says that the legal restrictions apply to 'all who have been employed', and this must include those who have been dismissed.

Example 3: Assessing the Impact of Additional Evidence

This type of question will typically ask you to consider what would weaken or strengthen an argument. You need first to be clear about what the argument is trying to establish. Work out what the conclusion is, and then consider what effect each of the possible answers would have on the conclusion.

Polar bears in captivity frequently engage in obsessive patterns of behaviour, pacing back and forth on the same spot, swinging their heads from side to side, and showing other signs of stress. They do this even when their living areas are quite spacious. What this shows is that conditions of captivity are not a satisfactory substitute for the natural environment of the polar bear species.

Which one of the following, if true, would most weaken the above argument?

- A** Polar bears are especially ill-suited to a life in captivity.
- B** Many polar bears in the wild engage in obsessive patterns of behaviour.
- C** Polar bears in captivity are much better fed than those living in the wild.
- D** Polar bears in the wild cover many miles a day when they are hunting for food.
- E** Polar bears which have been reared in captivity are incapable of surviving in the wild.

The answer is **B**. The conclusion of the argument is that the obsessive behaviour of polar bears in zoos shows that conditions of captivity are not a satisfactory substitute for the polar bear's natural environment. But if **B** is true, that is, if polar bears in the wild behave in the same way as those in captivity, then the behaviour of those in captivity cannot be taken as good evidence that the conditions of captivity are unsatisfactory.

A does not weaken the argument. If polar bears are ill-suited to a life in captivity, it follows that captivity is not a satisfactory substitute for their natural environment. So **A** strengthens the argument.

C does not weaken the argument, even though it suggests that polar bears might be better off in one respect in captivity (that is, better fed). Captivity might nevertheless lead to stress which is not suffered by polar bears in the wild.

D does not weaken the argument, because, even if polar bears cover many miles per day in the wild, pacing around in captivity may not be a satisfactory substitute for this freedom to roam.

E does not weaken the argument, because the conclusion is about the best environment for the polar bear species. Information about the best environment for those polar bears which have been reared in captivity cannot weaken this general conclusion about the species as a whole.

Example 4: Detecting Reasoning Errors

This type of question asks you to identify the flaw in the argument, which means that you must identify why the conclusion does not follow from the reasons that are given. So you need to be clear about what the conclusion is and what reasons are meant to support it.

Some recent films have been very expensive to make, but have not been the big box-office hits that would have justified the expense. At the same time, there have been films made very cheaply which have been received with both huge critical and popular acclaim. Indeed, some directors who have made successful low-budget films have gone on to make unsuccessful but expensive films. It is obvious then that if directors want to make popular films they should stick to low budgets.

Which one of the following is the best statement of the flaw in the argument above?

- A** Critics are often wrong in their predictions about the popularity of films.
- B** The cost of making a film is normally greater than its original budget.
- C** The cost of a film need not be the factor that determines its popularity.
- D** The popularity of a film would justify a high level of expense in making it.
- E** The public does not necessarily know whether a film has been expensive or cheap to make.

The answer is **C**. The argument draws the conclusion that if directors want to make popular films they should stick to low budgets. The reasoning offered in support of this is that:

- (i) some recent films have been very expensive to make, but have not been successful enough to justify the expense;
- (ii) there have been films made very cheaply that have been very popular; and
- (iii) some directors who have made successful low-budget films have gone on to make unsuccessful but expensive films.

But the conclusion does not follow, because the argument fails to establish a causal link between the cost of making a film and its popularity: it fails to consider high budget films that have been popular and low budget films that have been unpopular. **C** is the statement which best explains this.

A does not describe the flaw, because it simply states something that may be true but is of little relevance to the argument.

B does not describe the flaw, because the argument does not depend upon a comparison of original and final budgets.

D does not describe the flaw, because it states something that may be true but, if anything, contradicts the conclusion of the argument.

E does not describe the flaw, because it simply states something that may be true but is not relied upon by the argument when reaching the conclusion.

Example 5: Applying Principles

In this type of question you are asked which statement illustrates the principle underlying the passage. A principle is a general recommendation, which in the passage will be applied to just one particular case, but which could also be applied to other cases. In order to answer this type of question, you must first identify this principle and then consider each of the options to see which one follows from that principle.

Smokers who suffer from heart disease which is caused by their smoking should not be allowed to get free health treatment. That is because this is an example of self-inflicted illness. Those whose actions have caused illness or injury to themselves should make a financial contribution to their treatment.

Which one of the following best illustrates the principle underlying the argument above?

- A** Children should get free dental treatment, even if they eat sweets which cause dental decay.
- B** Heart disease sufferers who can afford to pay for health treatment should not receive free treatment.
- C** Smokers who cannot afford to pay for healthcare should be allowed free treatment when they are ill.
- D** People who are injured in car accidents should receive free treatment regardless of whether they were wearing a seat belt.
- E** Motor cyclists whose head injuries are caused by not wearing a crash helmet should make a financial contribution to their treatment.

When you are asked which statement illustrates the principle underlying the passage, you must first identify this principle. For example, someone might use the principle 'Killing is wrong' in order to argue for pacifism, that is, for refusing to go to war. If we are to accept the principle that killing is wrong, then it also follows that capital punishment is wrong and even that killing in self-defence is wrong.

In order to answer this type of question, you first need to understand the argument, so look for the conclusion and for the reasons in the usual way. This should enable you to see what principle the argument relies on in order to draw its conclusion. You then need to consider each possible answer to see which one follows from the principle.

The conclusion of this argument is that smokers who get heart disease as a result of smoking should not get free health treatment. The reason given for this is that their illness is self-inflicted.

This reasoning relies on the general principle that if your actions have caused your illness or injury, you should make a financial contribution to your treatment.

The correct answer is **E**, which applies the principle to motor cyclists whose failure to wear a crash helmet has caused their head injuries.

A is not an application of the principle, because it suggests that even if a child's actions (eating sweets) have caused a health problem (dental decay) the child should nevertheless have free treatment.

B is not an application of the principle, because it makes a recommendation based on people's ability to pay for treatment rather than on whether their actions have caused their illness.

C is not an application of the principle, because, like **B**, it makes its recommendation solely on the ability to pay.

D is not an application of the principle, because it recommends free treatment regardless of whether people's actions have contributed to their injuries.

Problem Solving

Problem Solving involves reasoning using numerical and spatial skills. The Problem Solving questions in the assessment are of three kinds, each assessing a key aspect of insight into unfamiliar problems. The three kinds of question are Relevant Selection, Finding Procedures, and Identifying Similarity. Although most questions fall into one category, some questions fit into more than one of the categories.

The examples on the following pages show the three kinds of Problem Solving question in the assessment.

Example 1: Relevant Selection

Very often a real world problem will be overloaded with information, much of which is unimportant. The first step in solving the problem is to decide which bits of the information available are important. It may be that the question has presented you with information which is not important, perhaps redundant, and possibly distracting. This kind of question demands Relevant Selection, in which the task is to select only that information which is necessary and helpful in finding a solution.

The following table gives figures for the percentage growth per year of labour productivity per person per year in various countries during three periods.

	Period 1	Period 2	Period 3
Japan	8.5	3.0	3.2
France	5.4	3.0	2.6
United Kingdom	3.6	1.5	2.4
Belgium	3.3	2.8	2.3
Sweden	4.1	1.5	1.8
Denmark	4.3	2.6	1.7
Italy	6.3	3.0	1.6
Netherlands	4.8	2.7	1.6
Germany	4.5	3.1	1.6
United States	2.2	0.0	0.8

Which country's percentage growth per year was greater than half of its Period 1 level in both Period 2 and 3?

- A Belgium
- B Denmark
- C France
- D Germany
- E United Kingdom

For this question, you need first to be clear what you need to do to find the answer: you must identify which row of the table contains numbers in the 'Period 2' and 'Period 3' columns that are more than half the number in the 'Period 1' column.

By quickly comparing the 'Period 1' and 'Period 2' columns, you can eliminate all but France, Belgium, Denmark, Netherlands and Germany. By comparing 'Period 1' and 'Period 3' you can eliminate all but Belgium. So the correct answer is **A**.

Example 2: Finding Procedures

Sometimes you will find that even if you have selected all the relevant information, no solution presents itself. Questions of this type often provide you with very little information, all of which may be needed in order to solve the problem. You then have to find a method or procedure which you can use to generate a solution. Typically you will have three or four numbers which have to be operated on. This aspect of Problem Solving is called Finding Procedures.

The 400 seats in a parliament are divided amongst five political parties. No two parties have the same number of seats, and each has at least 20.

What is the largest number of seats that the third largest party can have?

- A 22
- B 118
- C 119
- D 120
- E 121

Five parties share 400 seats. For the third largest party to have the maximum number of seats, the other parties must have the minimum number, whilst still meeting the other conditions set out in the question. So the fourth and fifth largest parties will have 21 and 20 seats respectively. This leaves 359 seats to be divided between the three largest parties.

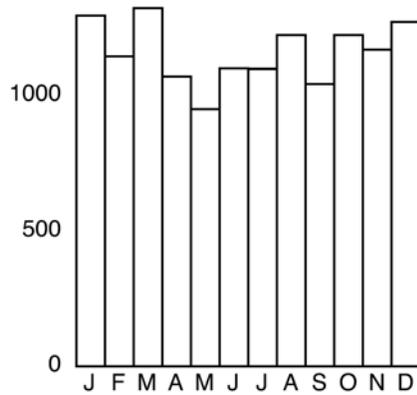
For the third largest party to have as many seats as possible, the other two must have only slightly more seats. If we divide the remaining 359 seats as nearly as possible into thirds, we get: 1st = 120; 2nd = 120; 3rd = 119. However, this violates the condition that no two parties have the same number of seats. To avoid this, one of the seats of the third largest party must be transferred to the largest party.

This gives: 1st = 121; 2nd = 120; 3rd = 118; 4th = 21; 5th = 20. The answer is **B**.

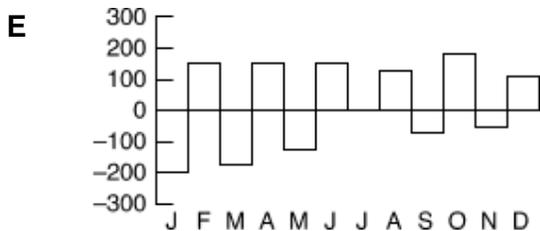
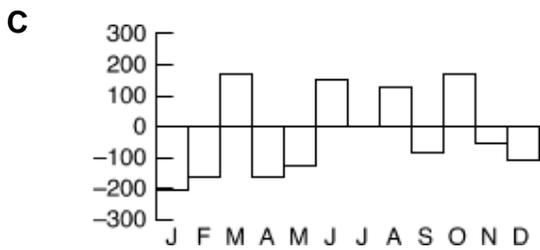
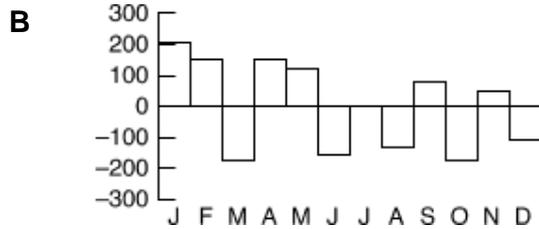
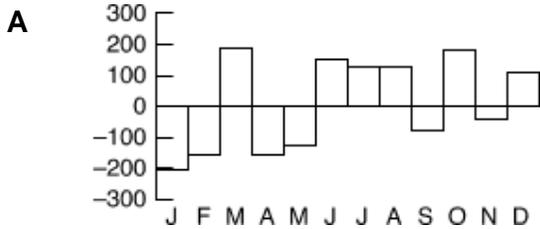
Example 3: Identifying Similarity

These questions are about being able to recognise data in a different form to that presented. The data is often presented in two different forms such as a table and then some graphs. It may also include spatial reasoning.

The graph below shows a person's bank balance at the end of each month in a year.



Which one of the following graphs could show the actual change in the bank balance each month?



To solve this problem, you must first be clear about how the two types of graph represent the same information. The main graph shows the balance at the end of each month; the graphs in the options show us the *change* in the balance during each month. So, for example, the bar for February in the options represents the difference between the bars for January and February in the main graph.

In the main graph, the balance goes down between the end of January and the end of February, so the bar for February in the options should be negative. A comparison of the options shows that this is true only for options A, C and D, so options B and E can be excluded. By comparing the values for each month in this way, you should find that the correct option is **D**.

Part 2

The second part of Section 1 of the Geography Admissions Assessment assesses the ability to understand and draw meaning from texts in a multiple-choice format. This part of the assessment is not subject-specific, and texts included will be on a variety of topics and may be drawn from a range of sources.

All academic subjects require the ability to critically read a variety of sometimes challenging texts for meaning. Specifically, the tasks in Section 1, Part 2 focus on identifying the way in which the texts are structured, the main ideas being presented, and the way in which these are supported and developed.

The Reading Comprehension consists of three tasks, each based around text excerpts. Each task will have a set of multiple-choice questions with four options. Questions will not require specialist knowledge or any information beyond what is contained within the texts.

Content

Each task will use recently written texts, from authentic sources, in English. Sources may include works of non-fiction (at a relatively high level conceptually and linguistically but which do not assume specialist subject knowledge), newspapers, general interest magazines, book reviews, abstracts written for research papers or journal articles, and professional websites. Texts will not depend on the understanding of specific aspects of British culture.

Questions will require candidates to:

- look at the main ideas and focus of a text;
- analyse the detail and distinguish opinions and attitudes presented in the text;
- determine the writer's purpose in writing the text, including consideration of intended audience;
- extract implications and implicitly stated elements of the text;
- draw comparisons and contrasts within a text or between different texts.

For all tasks, the emphasis is on identification of opinion, attitude, purpose and inferred meaning rather than the retrieval of directly stated factual details. Questions may also focus on elements of text organisation which support meaning, such as the use of exemplification and comparison.

Format

Section 1, Part 2 consists of three tasks. **Candidates will be required to answer all questions in all of the tasks.** Each task will consist of one or more text excerpts and a set of four-option multiple-choice questions. There will be no overlap between tasks. Answers to questions will not depend on other questions.

Task 1: Understanding Short Texts

Questions in this task are on two short abstracts or reviews on a common topic. Texts will be no more than 200 words each. The task assesses a candidate's ability to identify, compare and contrast features of two different texts. The candidate's understanding of the two texts is tested through discrete questions aiming to cover a wide range of focuses with the emphasis on identification of opinion, attitude, purpose and inferred meaning rather than the retrieval of directly stated factual details. Questions may also focus on elements of text organisation which support meaning, such as the use of exemplification, comparison and reference.

Task 2: Multiple-Matching

Questions in this task are on four short extracts, either from four different writers on the same theme or four extracts from the same source. Extracts will be no more than 200 words each. This task requires candidates to locate a text where a particular idea is expressed, discounting ideas in other texts which may appear similar but do not reflect the whole of the question accurately. Each question requires the candidate to scan the four texts to locate the area of text which appears to contain the answer, and then to read this carefully to check that it is the correct answer.

Task 3: Understanding Extended Text

Questions in this task are on one extended text (of no more than 1000 words). The task assesses the understanding of a longer stretch of academic text which may include argument, supported claims, and reference to previous work and ideas in a particular field.

Scoring

All questions are worth 1 mark. Marks are not deducted for incorrect answers, so candidates are advised to answer all questions.

A specimen task for Section 1, Part 2 is included in Appendix 1 to this document.

Section 2

Section 2 is designed to assess candidates' data analysis and interpretation skills. It does not assume or require background knowledge of the particular topic area. Instead, candidates are asked to write an essay in which they respond to a graph or map presented.

Answers should include the following four elements:

1. **DESCRIBE:** Description of any patterns or trends that can be seen; comment on outliers, where appropriate.
2. **CRITIQUE:** Consideration of the strength of the relationships that can be seen and the reliability of the evidence that has been used.
3. **EXPLAIN:** Suggestions for explanations for the patterns and trends that are observed.
4. **ELABORATE:** Consideration of the implications of what has already been discussed. May also include suggestions of primary data collection and/or the use of additional secondary data which could usefully be consulted to develop a fuller picture of the issues being discussed.

Candidates are not restricted to these elements and they do not need to address them in this order. Specific points for consideration will be included after the introduction to the task.

Only one task will be given, in other words there is no choice of question.

Candidates will have 40 minutes to complete the task.

There will not be a model or ideal answer for this section of the assessment, and no formal marking scheme. This is to allow merit to be awarded to students who provide an unexpected, but well-reasoned, answer. Those reading the answers will consider the extent to which the four elements detailed above are addressed, and the quality of candidates' observations, reasoning, and use of English.

APPENDIX 1

Specimen Questions

Section 1, Part 2

Task 1

Read the two abstracts below, which give summaries of two academic articles relating to cities and urban development. For questions 1 – 6, choose the answer (A, B, C or D) which you think fits best according to the texts.

ABSTRACT ONE

Retrofitting cities: Local governance in Sydney, Australia

Robyn Dowling, Pauline McGuirk, Harriet Bulkeley

Transforming cities to a lower carbon future is a key challenge of contemporary urban governance. Retrofitting the city – or modifying existing urban infrastructures, buildings and daily life to suit different energy sources and expectations of energy consumption – is essential to this transformation. In urban studies, little focus has been applied to the shape and character of urban governance frameworks and mechanisms required to successfully retrofit cities. In this paper we address this **lacuna** by exploring the logics, practices and dynamics of retrofitting governance in the Australian city. Using a **governmentality** perspective, the paper identifies the involvements of different scales of government in retrofitting policies and mechanisms and connections between them. Based on our survey of carbon reduction initiatives involving government, business and community actors across Australia's cities, we outline the types of retrofitting solutions being proposed and enacted. Focussing on initiatives from Sydney, Australia's largest city, the paper documents four key techniques through which retrofitting is being governed – self-governing, **holistic**, facilitative and educative. The findings indicate that governance gaps remain in attending to the daily life of technologies and the **materiality** of daily life.

ABSTRACT TWO

Critical research on eco-cities? A walk through the Sino-Singapore Tianjin Eco-City, China

Federico Caprotti

This article uses the narrative tool of a walk through Tianjin Eco-City, China, as an entry point in raising and discussing key questions in contemporary eco-city research. Eco-city projects are becoming increasingly prevalent in policy and political-economic discourses in a variety of locations as new urban spaces where blueprints for low carbon economies can be trialled. In light of this, the article highlights the necessity of, firstly, considering scale when analyzing eco-city 'futures'. Secondly, the article argues for the need to interrogate eco-cities' definitions, as well as their evaluation, performance and monitoring frameworks, as this will aid in critical analyses of the marketing and presentation of actually built eco-city projects. Thirdly, the question of **internal social resilience** needs to be assessed: this is of crucial importance in light of the **exclusive, gated nature** of several flagship eco-city **projects under construction** at present. Lastly, the article argues that research on eco-city projects needs to consider not only high-tech, **new urban environments**, but also the low-paid workers who form what the article calls the **'new urban poor'**, forming large, often transient populations on the edges of flagship 'sustainable' urban projects worldwide.

- 1 According to Abstract One, what is the main aim of the article on retrofitting cities?
- A to defend the idea of retrofitting
 - B to point out weaknesses in retrofitting technology
 - C to describe the technology required for retrofitting
 - D to look at methods of achieving retrofitting
- 2 Which word from Abstract One describes the theoretical framework used by the writers in their analysis of retrofitting in Sydney?
- A 'lacuna'
 - B 'governmentality'
 - C 'holistic'
 - D 'materiality'
- 3 In Abstract One, the writers claim that one feature of their research is that
- A they have engaged with an area representing a weakness in the field.
 - B they have proposed a way of integrating key techniques.
 - C they have identified potentially divisive underlying attitudes.
 - D they have employed a controversial methodology.
- 4 In Abstract Two, the writer says that eco-city projects are important because
- A they show that low carbon economies are sustainable.
 - B they provide an opportunity for testing economic models.
 - C they offer new opportunities for disadvantaged groups.
 - D they encourage political involvement in environmental issues.

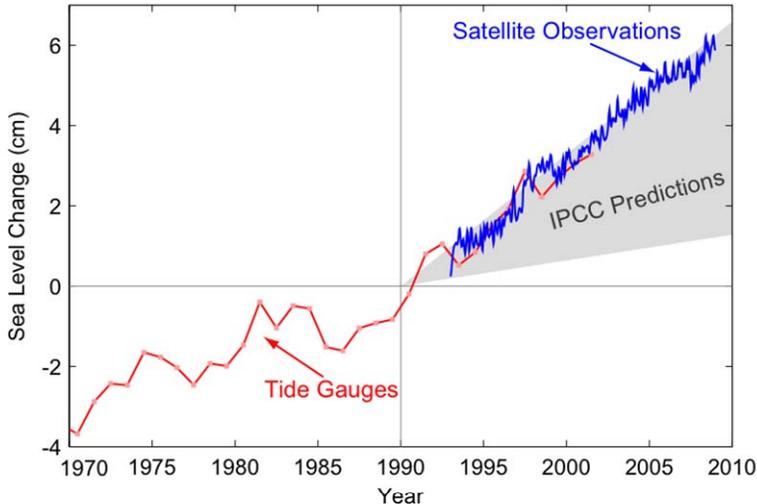
- 5 In Abstract Two, 'exclusive, gated nature' contrasts with
- A 'internal social resilience'.
 - B 'new urban environments'.
 - C 'new urban poor'.
 - D 'projects under construction'.
- 6 Which abstract refers to the physical experience of a particular city being used as a stylistic device?
- A neither abstract
 - B both abstracts
 - C Abstract One only
 - D Abstract Two only

Key

1 D 2 B 3 A 4 B 5 C 6 D

Section 2: Specimen question 1

Sea level change



Sea level change 1970–2010



The diagram above comes from an international climate change meeting – The Copenhagen Diagnosis – held in 2009. It shows sea level change between 1970 and 2010. It contains three different types of data:

- 1) a record of sea level as measured by tide gauges change since 1970;
- 2) a record of sea level change that comes from satellite observations since 1992; and
- 3) *predictions* from the IPCC 3rd Assessment (2001) for global average sea level change 1990–2010.

The IPCC is a scientific body established with the support of the United Nations and its member governments. IPCC reports cover ‘the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation’.

With reference to the data shown in the diagram, write a short essay exploring the issues related to monitoring environmental change, sea level variability and climate change uncertainty. Answers should include some or all of the following elements in your answer, where relevant:

- A **description** of the overall pattern of sea level change between 1970 and 2010 shown in the diagram. You might also describe the differences that you see in the three different types of data, and outline the variability in patterns.
- A **critique** of the ways you think that the different data have been collected. You might think about the differences between the different measurements and observations, and the problems of predicting longer-term changes.
- An **explanation** of possible reasons for the patterns observed, and an **elaboration** of any limitations to using these types of data, as well as any implications or other comments that you think are relevant.

Notes on how this task would be assessed

The aim is to see how well the candidate can understand the different components of the diagram and what lies behind them; and to use the diagram to think about the collection and collation of different data sets. In this case there are observations and predictions, which are applied to environmental change, sea level variability and climate change uncertainty.

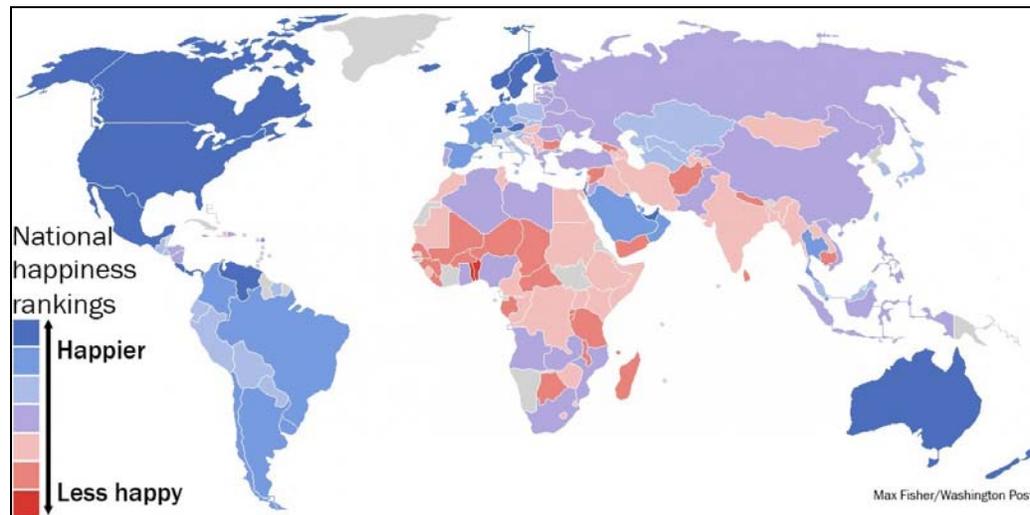
A description of the general pattern of sea level change shown in the diagram is a good place to start. Candidates should note the different data sources, and the different ranges of the data points in three series. Candidates might note that *observations* tell us that sea level has generally gone up, but some candidates might also note that the *rate* of sea level rise appears to be *accelerating*. Candidates might include some specific figures of change and the time period over which they observe such change.

A critique of the ways you think that the different data have been collected should be given. Candidates should note the *different* variability in the measurements from tide gauges and satellite observations. They can speculate about whether these might be connected to *measurement* issues. Candidates will not be expected to know how tide gauges work, but they *might* think about the effects of location or number on the data collected. The satellite observations might be less affected by such issues of sampling as they offer global-scale coverage and frequent measurements. Some candidates might remark that there is some overlap between these observations and the tide gauge record in the period 1992–2002 but that the satellite record *appears* to show higher sea levels. Candidates should also discuss the widening variability in the IPCC predictions for the period after 1990. They might comment that uncertainty widens as models are projected further into the future, and gesture at why this might be the case. Again, no background knowledge is necessary. Some of this can be inferred from the variability even in the *observed* patterns on the diagram.

In discussing possible explanations for the patterns observed, candidates are likely to talk about sea level rise as a consequence of global warming. They might note the effect of water flowing into the oceans from the ice that melts on land. The uncertainty comes from the difficulty in modelling the ice melt term, particularly in modelling the behaviour of the large ice sheets of Greenland and Antarctica which hold most of the Earth's reserves of freshwater. No scientific knowledge is *assumed* here, but, when reflecting on the diagram, candidates might point out that past IPCC predictions are shown to have been conservative – with actual values tracking the upper estimate. There is a possible *implication* here for future modelling, and some candidates might suggest that scientists should adopt the upper bound of future predictions.

Section 2: Specimen question 2

Mapping Happiness



The map above is derived from data in the United Nations World Happiness Report, 2013. This report attempts to rank the happiness of individual countries, and the map illustrates these differences on a crude relative scale of more and less 'happy'. Please note that the UN Report combines three individual measures in order to provide an assessment of a country's 'happiness', each of which are evaluated by Gallup polls of at least 3,000 people, over the years 2010, 2011 and 2012. These measures are: (i) **life satisfaction** expressed on a scale of 1 to 10; (ii) **positive emotional state** the prior day (using prompts such as 'Did you smile a lot yesterday? Did you experience enjoyment?'); and (iii) **negative emotional state** the prior day ('Did you experience anger or sadness?').

Please consider this map carefully and use it as the basis for a short interpretive essay on the global distribution of happiness and attempts like the above to measure and compare happiness.

Your answer should include the following:

- A description of the patterns that are revealed on this map;
- Possible explanations – what relation you think these patterns have to the distribution of wealth, income, and other indicators of global development;
- A discussion of the survey's methods of measuring happiness, their advantages and limitations;
- Your overall evaluation of this attempt to measure and compare happiness: whether you think the survey is worthwhile, and why.

Notes on how this task would be assessed

The aim of this exercise is to encourage applicants to explore 'happiness' as an alternative or additional index of global development, and specifically to assess their responses on four criteria. These are: the student's ability to describe the patterns in the UN happiness map; their ability to offer informed and well-argued possible explanations for these patterns; their ability to evaluate the methods and methodologies behind the collection of the survey data; and their ability to assess the

survey and map, whether negatively or constructively, considering what it might be used for and what the consequences of such an initiative might be.

Context: ‘Happiness’ has become in recent years an explicit aim of government policy in different parts of the world, and of development organisations, sometimes as a supplement to traditional indices, sometimes as an aim in itself. However, what ‘happiness’ means is clearly complex and hard to measure, and this media-friendly term overlaps and competes with other conceptions such as ‘life satisfaction’, ‘well-being’, and so on. Moreover, typically, several indicators and metrics are combined in such metrics – either collecting several presumed measures related to ‘happiness’, or adding these to a range of other measures of development. All of these options have particular advantages and disadvantages. All of them raise important questions relating to what ‘happiness’ might be, as well as how it might be measured and compared, and the uses to which such data might be put.

Assessment: In terms of descriptions of patterns in the map, the obvious things to note are the comparatively high ratings of ‘happiness’ reported by people in the ‘developed’, ‘Western’ world and the ‘Global North’. There is a mixed picture for those countries we might consider emerging nations, such as the BRICS. And the picture for Africa, particularly sub-Saharan Africa, is mixed to very low on this scale. Some students might be able to pick out anomalies here, such as the very high reported happiness in Scandinavia, the relatively high ranking of Saudi Arabia, the relatively low ranking of Russia, India, and so on.

As far as suggested explanations go, candidates would certainly be expected to consider the relation of happiness to traditional indicators of economic success (such as GNP, wealth, income per head, etc.) – this is essentially the ‘does money buy you happiness?’ question. Some might, and should, consider related questions, such as the relation of happiness to social and economic development in a wider sense. The more thoughtful answers could consider the relation of happiness to questions of social security and social welfare, to crime, insecurity, and actual or perceived corruption, to social inequality and social cohesion – although it is not expected that the vast majority of answers will refer to most or all of these potential explanations. There is, moreover, no right answer – the data suggests competing explanations and the inadequacy of simple responses. The most important thing here is probably to place the overall level of national economic development or individual wealth in a prime position, but to at least consider other factors that might impact on how ‘happy’ people report themselves to be in these surveys.

A crucial element of assessment relates to the methodological discussion. Candidates would be expected to think very critically about the specific methods here, the limitations of the three measures used in this particularly survey, and the possibility of using other questions, approaches, or sources of data. For instance, for two questions we have a subjective rating related to an individual’s experience the previous day, rather than, for instance, satisfaction relating to the course of their lives, or their families, and so on; quite possibly ‘cultural’ questions come into play here. Candidates would also be expected to consider the scale at which these measures are mapped, which of course ignore variation within countries, and the fact that survey respondents were asked simply to evaluate themselves rather than explicitly compare themselves with other people in other countries and situations. And candidates should note how crudely the data on which this is based has been mapped: the scale here is a simple, unquantified, relative measure of ‘more’ and ‘less’ happy – difficult to interpret without looking at the data themselves. So candidates would certainly be expected to think carefully about how this map is constructed and not to take it at face value.

Overall, candidates are expected to be aware of the limitations of this UN report, and its implications, and to be critical of how it might be used. They might well be critical in a wholly negative way, or, more positively, by thinking about how such an exercise might be improved. In this element of the exercise, the ability of students to step back and consider the larger questions is clearly called for.

APPENDIX 2

The mathematical knowledge and skills needed for Problem Solving

Number concepts

- simple fractions
- place value (for example, knowing that the "5" in "7654" indicates "50")
- ideas about percentages (for example, the idea that 1% could be thought of as "1 in every 100", and that if 20% of a group of adults are men, 80% must be women).

Numerical operations

- the four rules of number (addition, subtraction, multiplication, division)
- percentage operations (for example, if something was sold at £10, and is now advertised at "20% off", how much would the customer pay?)
- calculations in everyday contexts (complex calculations with fractions and decimals are not required).

Quantities

- time and the calendar
- money
- measures as shown below.

length	weight	area	volume (capacity)
kilometre (km)	kilogram (kg)	square centimetre (cm ²)	cubic centimetre (cm ³)
metre (m)	gram (g)	square metre (m ²)	litre (l)
centimetre (cm)			gallon
millimetre (mm)			

Knowledge of the following relationships is also required:

$$1 \text{ km} = 1000 \text{ m} \quad 1 \text{ m} = 100 \text{ cm} \quad 1 \text{ cm} = 10 \text{ mm} \quad 1 \text{ kg} = 1000 \text{ g}$$

Also required is knowledge of the terms for measurements which are used informally in daily life (e.g. feet, miles), but numerical relationships for these measures (e.g. 12 inches = 1 foot) are not required.

Space and spatial reasoning

- area (including the calculation of the area of a rectangle)
- perimeter (including calculation)
- volume (including the calculation of the volume of a box)
- reflections (in mirrors) and rotations of simple shapes
- two-dimensional (2D) representations of three-dimensional (3D) shapes (for example being able to interpret a "bird's eye view" of a house).

Generalisation

- recognition that some operations are generalisable, for example that converting 24 to 3 and 40 to 5 both involve division by 8 (formal algebra is not required).

Tables and graphs

- extracting information from graphs
- extracting information from tables.

