GEOGRAPHY **9751/02**

Paper 2 Data Response Questions **14Sept 2018**

3 hours

Additional Materials: Answer Paper
1 Insert
World outline map (optional)

READ THESE INSTRUCTIONS FIRST

Write your name and class on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Candidates answer **all** questions.

You should make reference to appropriate examples studied in the field or the classroom,
even where such examples are not specifically requested by the question.
Diagrams and sketch maps should be drawn whenever they serve to illustrate an answer.
The world outline map may be annotated and handed in with relevant answers.
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of **5** printed pages.

Innova Junior College **[Turn over**

Answer Scheme H2/P2

Section A

Theme 3: Geographical Investigation

1 A group of 20 18 year old students from a junior college in Singapore wanted to examine the impact of industries on local communities. They have decided to study the impact of Nordcom 1 and Nordcom 2, which are two new light industrial areas located near a residential area in Woodlands.

The students wanted to gather information on the impact of the industrial area on the residents living nearby, especially in terms of noise, pollution and economic impact. They were given one week to complete their investigation in August in 2018.

The students then decided to divide themselves into four teams of 5. Two teams carried out their investigation in the newly completed residential areas, HDB Sun Natura and HDB Sun Breeze; and two other teams carried out their investigation in the residential areas further away. They have decided to carry out questionnaire surveys by approaching residents who were walking by the shops or at food establishments. The questions asked in the survey were:

- "To what extent has the setting up of Nordcom 1 and 2 made an impact to your life?"
- "Has the impact been largely positive or negative?"
- "Has the presence of Nordcom 1 and 2 brought more income to the area?"
- "Are you affected by the noise or pollution generated from Nordcom 1 or 2?"

The investigation was conducted from 12pm to 1pm each day. Each group interviewed 25 residents in total.

Resource 1 shows a map of the surrounding area of Nordcom 1 and 2. Resource 2 shows the profile of Nordcom 1 and 2, explaining the type of activities found in the area. Resource 3 shows the collated results from the questionnaire survey.

(a) With reference to Resources 1 and 2, suggest a suitable hypothesis for the investigation and explain **two** reasons why the research is at a suitable scale. [3]

- The residents living nearest to Nordcom 1 and Nordcom 2, in Sun Natura and Sun Breeze, will face greater impact from the industrial areas compared to the residents living in residential areas further away. [1]
- Any two:
    - Enough manpower to conduct investigation. 20 students broken into four teams of 5.
    - Given time of one week is sufficient and manageable.
    - Area given is manageable, with the furthest residential area about 400m away from Nordcom 1 and 2.

(b) With reference to Resource 1 and the context provided, suggest and describe a suitable sampling method for the investigation. [3]

From notes:
  o **simple random sampling**: giving each member of the population an equal chance of being selected for the investigation (e.g. rolling a dice and selecting from a list of possible questionnaire respondents)
  o **systematic random sampling**: selecting every kth element of the sampling frame, beginning with a randomly chosen point (e.g. selecting the 9th person from an ordered list of respondents to interview)
  o **stratified random sampling**: selecting a simple random sample from given subgroups in the population (e.g. randomly select 5 focus group participants from different age cohorts)

(c) Your group concluded that the method of data collection through the questionnaire survey may not be completely reliable and accurate.

Explain how the process of data collection could be improved. [7]

Possible points (must be linked to accuracy/reliability)
  • HDB Sun Natura and HDB Sun Breeze are newly completed (Sun Natura in mid 2018) and the residents may not have lived in the area long enough to truly gauge the impact of Nordcom 1 and 2, as shown in responses to Q3 as well → questionnaire survey could take note of how long they have lived in the area
  • Similarly, Nordcom 2 is only ready in Dec 2018, which means that the residents may not be able to truly appreciate the impact of having Nordcom 2 in the area, especially in terms of positive impact → could have chosen a different location with a more established industrial area
  • Questions too vague - may not truly reflect the impact felt to residents in the area → could have probed to asked for examples on how the area has left an impact
  • 12pm – 1pm on weekdays would mean that the results would mostly come from elderly residents who are unemployed, or adults who are not working, such as housewives. Therefore, may not be able to get representative data. → could have conducted it on weekends or at different times of the day.
  • Sample size might be too small to get a representative conclusion (as also seen in Resource 3) → the team could have increased the sample size

Level	Marks	Descriptors
3	6-7	Response demonstrates accurate knowledge of survey collection methods, issues with both accuracy and/or reliability of these and relevant improvements. Reflects a good understanding of the context of the investigation and of data collection techniques.
2	3-5	Response demonstrates good knowledge of survey collection methods. Provides an explanation of issues relating to reliability and/or accuracy with some reference to possible improvements. Some of the responses may focus on generic fieldwork issues and improvements may not be relevant to the context of the investigation.
1	1-2	Response shows some knowledge of survey collection methods. Some reference is made to issues with reliability and/or accuracy but may recommend irrelevant or inappropriate improvements or provide inaccurate explanation of methods. Response may be of limited relevance to the given context.
0	0	No creditworthy response.

(d) Suggest one limitation of the data representation method shown in Resource 3 and sketch an alternative data representation method to show the perception of the residents on the extent to which the setting up of Nordcom 1 and 2 have made an impact to their lives. [4]

- Table – difficult to compare visually
- Any suggested data representation method that would allow for easy visual comparison. Must include:
  - 1m title
  - 1m accuracy of data
  - 1m labelling

(e) Evaluate the usefulness of the data shown in all the resources in helping students understand the impact of industries on local communities. [8]

Possible points for usefulness (all these need elaboration):
- R1 – useful to show the distance between residential areas and industrial areas.
- R2 – useful to understand the activities that goes on in Nordcom 1 and 2 and potential impact
- R3 – useful to understand perception of impact for areas closer to industrial area

Possible points for not useful:
- Findings are too vague, difficult to come to a conclusion, especially without the data for findings at residential areas further away.
- Requires more details to appreciate true impact of industries on local communities.
- Covers general economic impact (only income) and environmental impact (noise and pollution), but how about social impact, such as job opportunities, or other economic impact such as cost of living? Other impact such as heavy traffic, which can affect time taken to travel especially during peak hours, or safety concerns?

Level	Marks	Descriptors
3	7-8	Response demonstrates accurate knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides a logical and well-developed evaluation, which may include perceptive insights for the strongest responses. Reflects strong critical thinking skills and a good understanding of the requirements of the question.
2	4–6	Response demonstrates good knowledge and understanding of geographical investigation skills and methods relevant to the given context. Provides an evaluation, which may be limited in depth and detail. Response reflects critical thinking skills in general but may not always be relevant to the question.
1	1–3	Response shows inadequate knowledge and understanding of geographical investigation skills and methods. Response has some, though limited, relevance to the given context. Provides little or no evaluation. May include material that is irrelevant to the question.
0	0	No creditworthy response.

Theme 3: Climate Change and Energy

Climate Change in developing countries

4 Resource 11 shows a map of the world's mismanaged waste.
Resource 12 shows the global plastic production and use from 1950-2015.
Resource 13 shows an article on Starbucks' plans to eliminate the use plastic straws globally by 2020.

(a) Describe the distribution of mismanaged plastic waste as shown in Resource 11. [3]

- [general] Higher in LDCs compared to DCs
  [specific - high] Highest in Asia – China (8.8 million), Philippines (1.9 million), Vietnam (1.8 million)
- [specific - low] Lower in developed regions such as Europe and North America – Eg: European countries (generally all lower than 0.5 million), US (0.3 million)

(b) Account for how the distribution of mismanaged plastic waste shown in Resource 11

may have changed after 2010.   [3]

- With growing affluence, there might be greater consumption and industrialisation compared to before 2010, therefore, there might an increase in plastic waste in general, leading to a subsequent increase in mismanaged plastic waste.
- However, after 2010, some of the countries may have improved their waste management systems, in which plastic is properly disposed of or recycled, instead of littered and polluting the global waters.
- This may lead to a lower total amount of plastic waste in global waters after 2010.

(c) Explain how Resource 12 shows the linear nature of production, consumption and disposal of plastic waste.   [5]

Note – definition in notes: Linear metabolism refers to a process where raw materials are extracted, combined and processed into consumer goods that eventually end up as rubbish that is rarely reabsorbed into living nature.

- [How R12 shows it – shows understanding of linear metabolism] Resource 12 shows the linear nature of production, consumption and disposal of plastic waste as most of the plastic produced is disposed after one use and is not reabsorbed into living nature.
- [production] Resource 12 shows that out of 8.3 billion tonnes of virgin plastic produced, only 2.6bt is still in use (virgin plastic and recycled), and the rest disposed.
- [consumption] Most of the plastic is used for packaging, with 150 million tonnes out of 400 tonnes (37.5%).
- [disposal – after single use] 5.3 billion tones of plastic are immediately disposed after single use, with 0.7bt incinerated and the remainder (4.6bt) discarded.
- [disposal – after recycling] Even out of the 0.5bt of plastic that has been recycled, only 0.1.bt are recycled and still in use, with 0.4bt eventually being incinerated or discarded as well.

(d) With reference to Resource 12 and 13, evaluate the effectiveness of eliminating use of single-use plastic straws at Starbucks stores in contributing to the global reduction of plastic waste.   [5]

Effective – Reduces single use disposables and therefore reduces the amount of plastics used. Resource 12 shows that most plastic are used for packaging. Therefore, by directly reducing single use disposables like straws or by providing alternative, more eco-friendly options as described in Resource 13, the impact is reduced.

Not effective – However, the alternative strawless lids is also made of plastic and is also a large contributor to plastic waste. This makes it less effective as opposed to promoting recycling. For example, Starbucks could encourage more of its

consumers to bring their own cups or purchase reusable cups. As shown in Resource 12, only 0.5b tons of plastic is recycled out of 8.3bt. Therefore, with the encouragement of using reusable cups, this impact can be reduced.

Level	Marks	Descriptors
3	5	Response demonstrates a clear knowledge and understanding of the context in the question. Source(s) is well used to support the response. Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints.
2	3-4	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Source(s) is used to support parts of the response. Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.
1	1-2	Response demonstrates poor understanding of the context in the question. Source(s) is not used or not accurately used to support the response. Provides little or no evaluation
0	0	No creditworthy response.

(e) With reference to all resources and your knowledge, discuss the role of various stakeholders in minimizing the impact of plastic waste.   [9]

- Resource 10
  - o Role of state in providing sufficient infrastructure and regulation
  - o Role of industries to ensure that waste is properly disposed of
- Resource 11
  - o Role of individuals and companies to reduce single use plastic and to encourage greater recycling.
- Resource 12
  - o Role of companies in reducing single use plastic.
  - o Role of consumer in providing demand for such goods to reduce impact of plastic waste – affect how companies make decisions in production to meet the needs of the consumer.
- Own knowledge:
  - o Role of International Organisations to impose global regulations on pollution.
  - o Role of NGOs to create awareness and work with other stakeholders to find solutions to the problem of plastic waste pollution.

C H2 Generic Level Descriptors for Open-Ended 9m DRQ on Themes 1, 2 and 3

Level	Marks	Descriptors
3	7–9	Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response. • Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints. OR • Makes a decision which clearly addresses different elements of the issue and/or interest of different stakeholders
2	4–6	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response. • Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts. OR • Shows some attempt to address different elements of the issue and/or views of different stakeholders when making a decision but is not well-developed
1	1–3	Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited relevance to the question. Source(s) is not used or not accurately used to support the response. • Provides little or no evaluation OR • Evidence of decision-making, if present, is simple and may be flawed
0	0	No creditworthy response.

Note:
1. The assessment involves qualitative rather than quantitative evaluation. Judgements on the level to be awarded to an answer will be based on the principle of 'best fit' determined by the descriptors within each level.

Theme 1 : Tropical Environments

Mass Movement in Sierra Leone

2   Sierra Leone is located at 8° North of the African Continent. It is on the windward side of the Sugar Loaf Mountains. Freetown is the capital and largest city of Sierra Leone.

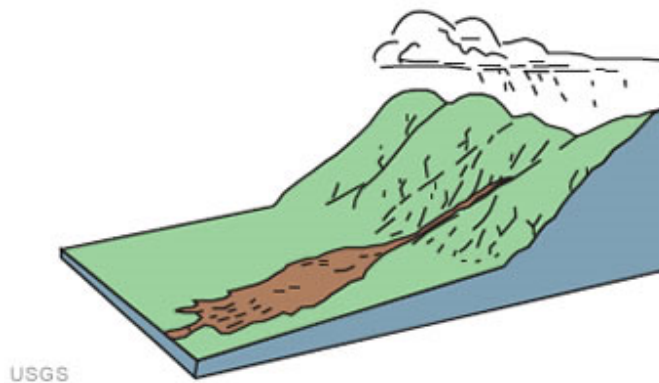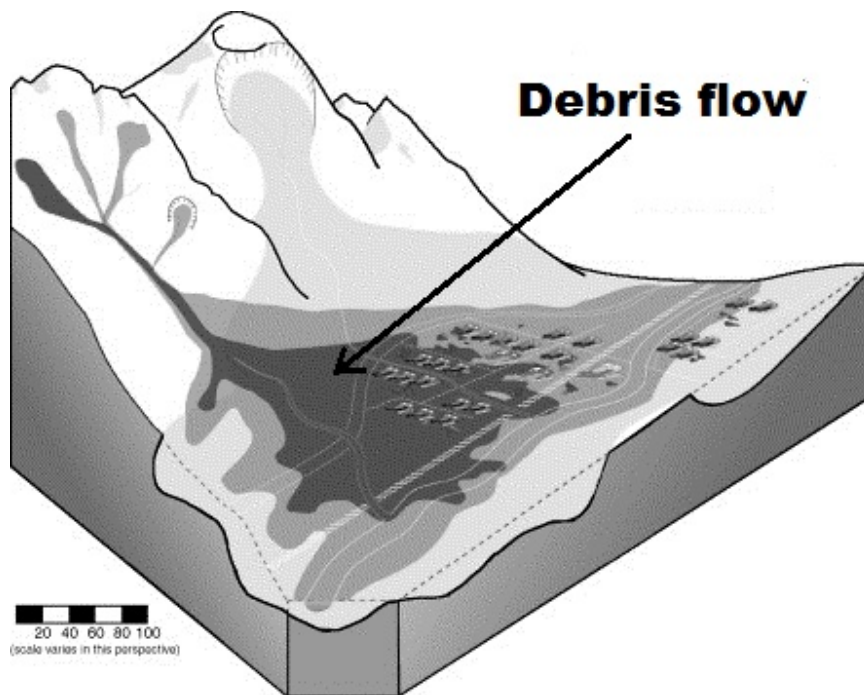Resource 4 shows the climate graph of Freetown, Sierra Leone at latitude 8° North .
Resource 5 shows a satellite image of mass movements that have occurred across the African continent.
Resource 6 shows the location of the mass movement that occurred in Sierra Leone.
Resource 7 shows a photograph of the mudslide that occurred in Sierra Leone in 2017.

(a)   Using Resource 4, state the probable climate of Freetown, Sierra Leone and account for its characteristics.   [5]
- Am climate
- High rainfall of 3027mm
- Near the coast and is at 8 degrees North so the full impact of the Monsoons will be experienced due to close proximity to the Atlantic Ocean
- Temperatures almost uniform with low diurnal range in the year due to its equatorial
- Distinct wet period for 4 months, when the monsoons (African) comes in

(b)   Using Resources 5 and 6 describe the relationship between topography and the different degrees of mass movements in the continent.   [4]

- Positive relationship
- When there is high topography there are more serious mass movements as shown by the yellow purple shading in Resource 7
- As one moves away from the high relief (mountains or hills) the degree of mass movements reduce
- Most of the coastal regions seem to have higher degrees of mass movements compared to the inner regions. Coastal regions that are at the windward side of the mountains seem to have higher degrees of mass movements
- Eventhough there are many mountains in the middle of the African continent – the degree of mass movements tends to be lesser. This seems to be an anomaly

(c) Using Resource 7, with the use of a well-labeled diagram, state the type of mass movement [5] that would have occurred and describe it.

USGS

- Debris Flow or Slide (Can be both)
-
- Many rills showing evidence of flow of water
- Loose mud, sand, soil and rock with a lot of water. Traveling down the slope
- Spread out at the foot of the hill

Debris slides and debris flows are triggered in steep terrain in connection with heavy rain and/or rapid snowmelt. Human encroachment on steep slopes may increase the risk of debris collapses and subsequent and debris flows. Debris slides, debris flows and debris floods are different, but partly overlapping, terms for a process where debris on a slope collapses and suddenly, or with a gradual acceleration, is transported down the slope. The initial collapse usually occurs on slopes steeper than 25 degrees. With increasing water content, the initial debris slide can pick up speed and develop into a debris avalanche or debris flow.

(d) Using Resources 6 and 7, explain the reasons for the mass movement. [4]

- Steepness (topography), gravitational pull, shear stress (res 6)
- Heavy rainfall induced by the coastal region, ITCZ, warm ocean currents
- Deforested land, many developments, steep, stability of the slope is affected

(e) Using all resources and your own knowledge, suggest reasons how the mass movement would have affected the natural and human environments. [7]

- Res 4 –rainfall is high, monsoon, loosening of the soil, as seen in Res 7 – also deforestation, cohesiveness of the soil is affected greatly.
- Trees / Biodiversity affected
- Rivers affected, Res 6
- Dangerous living conditions especially the yellow regions, liveability reduces as seen in Res 5
- Sierra Leone, Freetown is an example of how pple could have been affected socially – living region, clustered, death, economic activity affected (6 and 7)

Theme 2 : Development, Economy and Environment

Coal Mining and Production in China

3 China has one of the biggest coal reserves in the world. It has 10% of its economy focusing on the primary, 44% on the secondary/manufacturing and 46% targeted at the tertiary industries, respectively.

Resource 8 shows the distribution of coal resources in the world.
Resource 9 shows the production and consumption of coal in the US and China.
Resource 10 shows the degradation caused by coal mining in China.

(a) Using Resource 8, describe the distribution of coal resources in the world. [5]

- There is a need to describe both the AMOUNT and Quality of coal resources' distribution. And observe a pattern/trend/relationship in the resource available.
- Whether describing amount or quality, you have to look for the general trend and then provide supporting evidence or anomaly.
- In terms of amount, you can choose to RANK from highest to lowest the amount of resource availability (just a few countries) or the highest and the lowest. US has the most coal resource in the world, at 237 billion tonnes (do not forget the unit of measurements), followed by Russia at 157 billion tonnes and China at 115 billion tonnes. To make sense of the above, mention that the 3 countries together has close to 60% of the world total.
- Or for amount, you can make reference to the countries with the highest and lowest coal reserves. US has the highest coal reserves in the world at 237 billion tonnes, and Serbia (not Siberia) has the lowest at 14 billion tonnes amongst the 10 countries.
- Or you could have noted that there is a higher concentration of coal reserves in the northern hemisphere than the southern hemisphere. Coal reserves in the south make up only 107 billion tonnes and is less than 1/8 of the world total. And the 2 countries in the southern hemisphere with coal resources are South Africa and Australia.
- For quality, there are 2 types - Lower quality and higher quality (there are just too many who read the 2 wrongly). Also do note whether you are referring to absolute or relative amount. For instance, US may have a lower relative amount of higher quality coal, but the absolute total amount of higher quality coal - approximately 100 billion tonnes - is still one of the highest in the world.
  There is a higher proportion of lower quality coal than higher quality coal in Germany, US and Russia and Serbia and Ukraine. In the case of Germany 100 percent is low quality.
- Other countries have higher percentage of higher quality of coal. They are Kazakhstan, India, China and Australia. In South Africa, 100 % of the coal resources are higher quality.
- And to form some sort of relationship, it is important to note that countries with the greater amount of coal resources may not have higher quality coal. For instance US, Russia, and Australia, more than half of the reserves are lower quality coal. The exception is China where slightly less than half of the coal is of lower quality. In South Africa and Kazakhstan, where the coal reserves are smaller (less than 50 billion tonnes), a significant share of the coal resources are of higher quality. In Kazakhstan, close to half is of higher quality. Or you

could have noted that DCs may have proportionately more lower quality coal. For example, US, Germany, Australia. And LDCs seem to have more higher quality coal. For instance, South Africa, Inda and Khazakhstan.

Comments
- The failure to observe certain trends/ pattern/ relationship is most common amongst candidates. Many merely listed whatever comes to mind. Attempt to make comparison between DCs and LDCs or Northern and Southern Hemisphere can be a good starting point.
- Redundant statement to start the essay, such as "there is a spatial distribution of coal resources in Resource 8". BTW, 'Resource 8' has to be spelt with Capital R.

(b) Using Resources 9A and 9B and your own knowledge, suggest reasons why China's coal production has increased compared to that of the US. [7]

- Can look at reasons as consumption or demand driven, policy driven, environmentally driven, economically driven and political driven ones. A good answer should attempt to look at the reasons from different angles and to consider both China and US in your explanation.
- Resource 9A shows that China's coal production has increased relative to US's. The coal production in 1960 was comparable between the two countries at 400-500 million tons. But by 2010, coal production in China is 3 times more than that of US. This increase in production corresponds with the increase in coal consumption in China and US. It is noteworthy that about half of Chinese's coal produced or about 1300 million tons are being consumed internally. Whereas, in US, less than half of the US's coal or 700 million tons are consumed internally. Both countries are coal exporters.
- Due to rising affluence, rising population, China experienced an increased demand for energy resources, and hence the increase production of coal to meet these demands. Resource 9B shows the increase in consumption internally but for the US it has been hovering at 200-400 million tons (demand-driven) [Note that China's population increase is not enough to account for the more than 3 times increase in coal demand after 2000, for the population increase is far less than 3 times over the same period.]
- China is also undergoing industrialization, hence fueling the need to extract more coal resources to meet the demands of its manufacturing sector. Coal is used both as an energy source as well as raw materials in the manufacturing sector. On the other hand, US is undergoing deindustrialation and the closure of factories may mean the decline in need for coal as a resource and raw materials. (demand-driven) [Many have difficulties identifying the key concepts of industrialization and deindustrialization]
- Due to WTO entry, China could have entered into more favourable trade pacts to export more coal. Also, more TNCs are encouraged to shift to China, driving up the need for coal resources. The significant increase in coal production and consumption after 2000 corresponded with China's WTO entry in 2001 (policy-driven)
- Coal is afterall a cheapest form of energy option and hence it remains the favourite choice for a less developed country such as China. On the other hand, more Americans could have switched to cleaner form of energy which may also be more expensive in DCs with higher labour cost for coal extraction. In US,

the demand for coal has dropped from 2005, implying that coal is less favourable than other cleaner energy sources (economic or cost-driven reason)
- US could have pushed for the switch to cleaner and renewable energy resources, such as wind, solar and water. And there is a reduced demand for coal (environmentally-driven reason)

> Comments
> - There is a need to refer to Resources 9A and 9B, but do note that the 2 Resources do not provide specific reasons. They only help to justify the above reasons for the increase production of coal.

There (c) Using Resource 10, describe the impact of coal mining in China.

[5]

- The angle taken in answering the question is important. Do not merely read off what you see in picture, e.g, "The photos above in Resource 10 shows… land degraded by …." Instead you should be saying "coal mining has led to land degradation as shown in Resource 10. The land was cleared and removed of the precious topsoil, making the land highly vulnerable to mass movement…ground water leached toxic compounds and are ingested by the local population contributing to health risks" [Note the questions didn't ask you to read off what you see in the photographs]
- Some possible impacts – air and water pollution – Release of GHGs affecting the atmospheric and hydrological systems, social Issues – Health, Land Degradation (National Environment), Biodiversity of Fauna and Flora affected
- Many have difficulties with the second photograph and discuss the indirect impact of coal mining, saying how the factories combust coal resources to give off air pollution etc. Besides the potential health risks from combustion of coal, also consider how miners inhale the particulate matters during coal extraction and suffered from respiratory diseases.

> - Coal mining factories? Just too many refer to coal mining factories? They are either coal mines or coal processing factories.
> - Negative benefits? Please use only negative impact or positive impact.

(d) Using all resources and your own knowledge, evaluate whether China is affected by the resource curse.

[8]

- Begin by defining resource curse. Resource curse also known as the paradox of plenty, refers to the paradox that countries with an abundance of natural resources (like fossil fuels and certain minerals), tend to have less economic growth, less democracy, and worse development outcomes than countries with fewer natural resources. This often involved the resource rich countries being exploited by the DCs which import the resources.
- There is evidence showing that China is one of the top ten producers of coal in the world (Resource 8). So there is abundant resource in China, and China qualifies as a resource-rich country and Resource 9A and 9B show that there is high production (which could have arisen due to high demand) and consumption (usage) of coal in the country. So it means that the demand for the resource may be high. It could be used heavily by manufacturing industries as China is a workshop of the world. It has a high percentage of manufacturing or secondary

industries in the country which demands for coal (own knowledge) and locally it may be demanded greatly due to electricity needs etc. The coal has been tapped on to the advantage of the Chinese economy such that there is little evidence to suggest that China has been cursed by the abundant coal resource.

- Yet, the degradation shown in Resource 10 shows vast amounts of land which have degraded due to the extraction of coal and the pollution that occurs and affects the people. So it looks as if China may be facing the Resource Curse. The coal resources have made the people worse-off socially and environmentally.

- Based on contextual knowledge, it is to be noted that China is advancing rapidly economically as more TNCs are moving out of the country to invest in other countries, it is greatly revered as a manufacturing giant in the world. Every country seem to want to invest in China due to its attractive national policy on trade and finance. China not only has coal but other resources like oil and minerals. It is also moving slowly into the tertiary industry, having many service oriented industries especially in the SEZs eg: Pudong.

- China has a stable government. It has seen economic growth in recent years. And is part of the WTO and has FTAs with many countries like the US, India and Singapore. Being that the case it seems that China has diversified well enough not to be affected by the Resource Curse.

- Marks are awarded for fair EVALUATION of the issue. There is also a need to extract relevant information from the Resources and contextual knowledge to back up your answer.

Level	Marks	Descriptors
3	7-8	Responses demonstrates a **clear knowledge and understanding** of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s**) is well used to support** the response. -Provides a **logical and well developed evaluation** well founded on evidence and/or different viewpoints. Or -Makes a decision which **clearly addresses different elements** of the issue/or interests of different stakeholders.
2	4-6	A **satisfactory** response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) **is used to support parts** of the response. -Provides an evaluation, which **may be limited in depth and sufficient** elaboration in some parts Or -Shows **some attempt to address** different elements of the issue and views of different stakeholders when making a decision but is not well developed.
1	1-3	Responses shows a **poor understanding** of the context in the question. Uses basic factual information and conceptual understanding which had some but limited relevance to the question, Source (s) is **not used or not accurately used** to support the response. -Provide **little or no** evaluation Or -Evidence of decision making, if present is **simple and may be flawed**
0	0	No creditworthy response

Theme 3: Climate Change and Energy

Climate Change in developing countries

4 Resource 11 shows a map of the world's mismanaged waste.
Resource 12 shows the global plastic production and use from 1950-2015.
Resource 13 shows an article on Starbucks' plans to eliminate the use plastic straws globally by 2020.

(a) Describe the distribution of mismanaged plastic waste as shown in Resource 11. [3]

- [general] Higher in LDCs compared to DCs
  [specific - high] Highest in Asia – China (8.8 million), Philippines (1.9 million), Vietnam (1.8 million)
- [specific - low] Lower in developed regions such as Europe and North America – Eg: European countries (generally all lower than 0.5 million), US (0.3 million)

> Comments
> - Is it even appropriate to say that US has the leaset mismanaged waste when there are many countries without mismanaged wastes.

(b) Account for how the distribution of mismanaged plastic waste shown in Resource 11 may have changed after 2010. [3]

- Need to offer both the potential increase and decrease, and to look beyond just China's.
- With growing affluence, there might be greater consumption and industrialisation compared to before 2010, therefore, there might be an increase in plastic waste in general, leading to a subsequent increase in mismanaged plastic waste.
- However, after 2010, some of the countries may have improved their waste management systems, in which plastic is properly disposed of or recycled, instead of littered and polluting the global waters.
- This may lead to a lower total amount of plastic waste in global waters after 2010.

(c) Explain how Resource 12 shows the linear nature of production, consumption and disposal of plastic waste. [5]

Note – definition in notes: Linear metabolism refers to a process where raw materials are extracted, combined and processed into consumer goods that eventually end up as rubbish that is rarely reabsorbed into living nature.

- [How R12 shows it – shows understanding of linear metabolism] Resource 12 shows the linear nature of production, consumption and disposal of plastic waste as most of the plastic produced is disposed after one use and is not reabsorbed

into living nature. Then provide appropriate data/statistics to backup the response.

- [production] Resource 12 shows that out of 8.3 billion tonnes of virgin plastic produced, only 2.6bt is still in use (virgin plastic and recycled), and the rest disposed.
- [consumption] Most of the plastic is used for packaging, with 150 million tonnes out of 400 tonnes (37.5%).
- [disposal – after single use] 5.3 billion tones of plastic are immediately disposed after single use, with 0.7bt incinerated and the remainder (4.6bt) discarded.
- [disposal – after recycling] Even out of the 0.5bt of plastic that has been recycled, only 0.1.bt are recycled and still in use, with 0.4bt eventually being incinerated or discarded as well.

> Comments :
> - Many don't understand linear nature of production, consumption and disposal and merely read off all the data, without highlighting that there is limited to no recycling. And some even went on to talk about the plastics for packaging, building and construction, hence little credit can be given for the lack of understanding for the concept.

(d) With reference to Resource 12 and 13, evaluate the effectiveness of eliminating use of single-use plastic straws at Starbucks stores in contributing to the global reduction of plastic waste. [5]

- Note the command word of the question, hence a one-sided answer will not be given the full credit.
- Effective – Reduces single use disposables and therefore reduces the amount of plastics used. Resource 13 shows that Starbucks has more than 28000 stores worldwide, implying that the scale of the impact can be extensive. Resource 12 shows that most plastic are used for packaging. Therefore, by directly reducing single use disposables like straws or by providing alternative, more eco-friendly options as described in Resource 13, the impact is reduced.

- Not effective – However, the alternative strawless lids is also made of plastic and is also a large contributor to plastic waste. This makes it less effective as opposed to promoting recycling. For example, Starbucks could encourage more of its consumers to bring their own cups or purchase reusable cups. As shown in Resource 12, only 0.5b tons of plastic is recycled out of 8.3bt. Therefore, with the encouragement of using reusable cups, this impact can be reduced.

Level	Marks	Descriptors
3	5	Response demonstrates a clear knowledge and understanding of the context in the question. Source(s) is well used to support the response. Provides a logical and well-

		developed evaluation well founded on evidence and/or different viewpoints.
2	3-4	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Source(s) is used to support parts of the response. Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts.
1	1-2	Response demonstrates poor understanding of the context in the question. Source(s) is not used or not accurately used to support the response. Provides little or no evaluation
0	0	No creditworthy response.

(e) With reference to all resources and your knowledge, discuss the role of various stakeholders in minimizing the impact of plastic waste. [9]

- Stakeholders worth considering include government, TNCs, individual, non-governmental organisation (such as Greenpeace), media. It is most ideal to organise the paragraphs via the different stakeholders, ie., one for government, one for individuals etc.
- You can extract from the Resources the role of the stakeholders below.
- Resource 10
  - o Role of state in providing sufficient infrastructure (landfills) and regulation
  - o Role of industries to ensure that waste is properly disposed of
- Resource 11
  - o Role of individuals and companies to reduce single use plastic and to encourage greater recycling.
- Resource 12
  - o Role of companies in reducing single use plastic.
  - o Role of consumer in providing demand for such goods to reduce impact of plastic waste – affect how companies make decisions in production to meet the needs of the consumer.

- And from contextual knowledge, you can also observe the followings :
  - o Government can through campaigns raise environmental awareness.
  - o Individuals can make the efforts to reduce the use of plastic bags and plastic cups etc.
  - o Role of International Organisations to impose global regulations on pollution.
  - o Role of NGOs to create awareness and work with other stakeholders to find solutions to the problem of plastic waste pollution.
  - o Media can publicise the issue or even identify culprits of the environmental degradations.

C H2 Generic Level Descriptors for Open-Ended 9m DRQ on Themes 1, 2 and 3

Level	Marks	Descriptors
3	7–9	Response demonstrates a clear knowledge and understanding of the context in the question. Uses relevant, detailed and accurate factual information and conceptual understanding. Reflects strong critical thinking skills and may include perceptive insights for the strongest responses. Source(s) is well used to support the response. • Provides a logical and well-developed evaluation well founded on evidence and/or different viewpoints. OR • Makes a decision which clearly addresses different elements of the issue and/or interest of different stakeholders
2	4–6	A satisfactory response which is generally sound and contains relevant points, but may not always focus on the context in the question. Uses factual information and conceptual understanding that is generally appropriate to the given context but lacks detail and may contain some inaccuracies. Displays general critical thinking skills. Source(s) is used to support parts of the response. • Provides an evaluation, which may be limited in depth and sufficient elaboration in some parts. OR • Shows some attempt to address different elements of the issue and/or views of different stakeholders when making a decision but is not well-developed
1	1–3	Response shows a poor understanding of the context in the question. Uses basic factual information and conceptual understanding which has some, but limited relevance to the question. Source(s) is not used or not accurately used to support the response. • Provides little or no evaluation OR • Evidence of decision-making, if present, is simple and may be flawed
0	0	No creditworthy response.

Note:
1. The assessment involves qualitative rather than quantitative evaluation. Judgements on the level to be awarded to an answer will be based on the principle of 'best fit' determined by the descriptors within each level.