GEOGRAPHY SYLLABUS

Upper Secondary

Express

Normal (Academic)

Implementation starting with
2013 Secondary Three Cohort

Ministry of Education
SINGAPORE

CONTENTS

1. INTRODUCTION

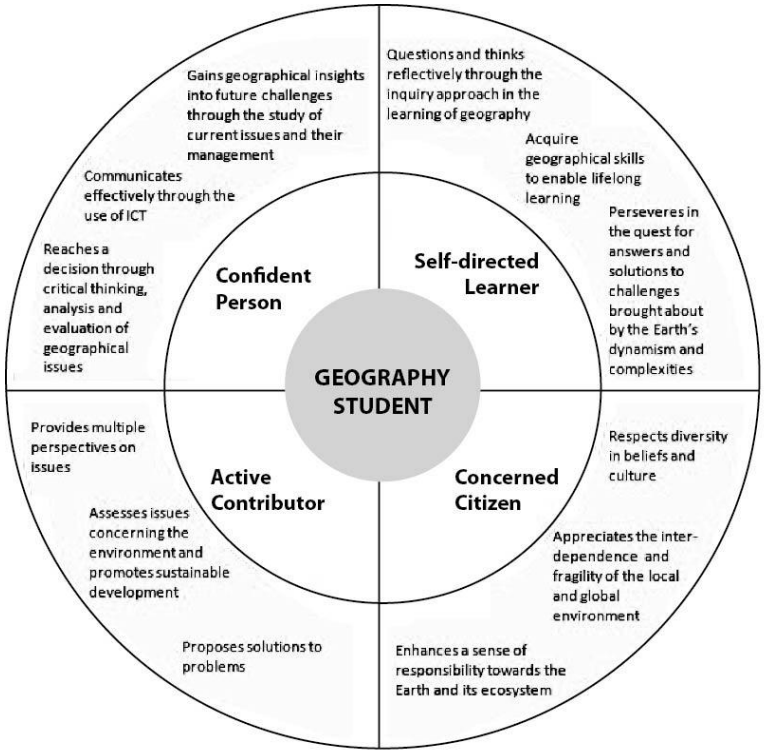
1.1 DESIRED OUTCOMES OF EDUCATION AND THE STUDY OF GEOGRAPHY IN SINGAPORE

The Desired Outcomes of Education (DOE) are attributes that educators aspire for our learners. These outcomes establish a common purpose for geography teachers, and serve as a compass to steer the teaching and learning process. The DOE for our learners are:

- a **confident person** who has a strong sense of right and wrong, is adaptable and resilient, knows himself, is discerning in judgment, thinks independently and critically, and communicates effectively;
- a **self-directed learner** who questions, reflects, perseveres and takes responsibility for his own learning;
- an **active contributor** who is able to work effectively in teams, is innovative, exercises initiative, takes calculated risks and strives for excellence; and
- a **concerned citizen** who is rooted to Singapore, has a strong civic responsibility, is informed about Singapore and the world, and takes an active part in bettering the lives of others around him.

The Upper Secondary Geography and Geography Elective syllabuses will enable students to acquire a wide range of knowledge and skills to understand and explain physical and human phenomena; and other contemporary environmental and social issues that occur in different places and cultures. Equipped with the skills of gathering and analysing information, and an inquiring mind to seek answers to issues affecting our lives and the world we live in, geography students will be prepared for their roles as informed citizens in the 21st century. The subject also imbibes in students an awareness of appropriate attitudes and values that promotes a positive geographical future; one that ensures the sustainability of our resources, people, country, and planet. These attributes would place students in good stead to attain the DOEs. An illustration of how Geography contributes towards the DOE in the Singapore education system is shown in Figure 1.

Figure 1: Desired Outcomes of Singapore's Education through Geography



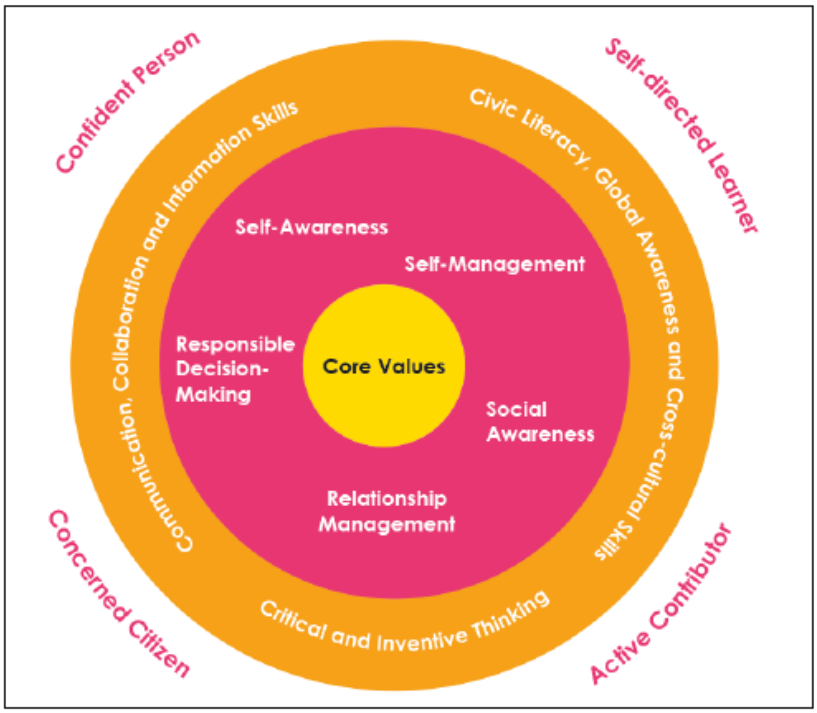
1.2 21ST CENTURY COMPETENCIES IN GEOGRAPHY

Globalisation, changing demographics and technological advancements are some of the key driving forces of the future. To help our students thrive in a fast-changing world, MOE has developed the 21st Century Competencies Framework (see Figure 2).

Geography involves the study of real world examples and case studies. It is one of the key subjects in the school curriculum for equipping students with 21st Century Competencies of civic literacy, global awareness and cross-cultural skills. The Geography curriculum facilitates students' appreciation of the spatial distribution of physical and human features. This enables students to realise that Singapore is highly interconnected with other places in many different ways; and that what happens elsewhere can impact Singapore. Geography therefore plays a pivotal role in assisting students to understand the impact of global issues like climate change and food security on Singapore.

When developing students' perspective on these issues, it is important to have them consider geographical issues from multiple angles in a systematic manner. They need to analyse data and information to critically arrive at reasoned conclusions. Training in other practical and transferable skills such as literacy, numeracy and graphicacy is also valuable in helping students manage information and communicate effectively.

Figure 2: 21st Century Competencies



1.3 AIMS OF UPPER SECONDARY GEOGRAPHY SYLLABUSES

The Geography and Geography Elective syllabuses focus on current geographical topics and associated issues designed to motivate students to study Geography. The syllabuses aim to encourage more classroom interaction and engage students in inquiry activities, similar to those which geographers themselves follow when attempting to solve problems. They seek to interest students by providing insights into future challenges through the study of current geographical issues of national, regional and global importance, and their management. They also foster the development of 21st Century Competencies in students by providing them with opportunities to engage in self-directed learning and collaborative learning, and promote consideration of students' sense of responsibility to other people and to the environment, and how students can contribute to a sustainable future.

AIMS AND LEARNING OUTCOMES

Aims

The Geography and Geography Elective Syllabuses aim to enable students to:

- Acquire knowledge of the characteristics, distribution and processes of physical and human phenomena
- Develop a holistic understanding of physical-human relationships at local, regional and global scales
- Gain geographical insights and global awareness into future challenges through the study of current issues and their management
- Become inquiring and self-directed learners who ask geographical questions and seek understanding through the collection and analysis of geographical information

- Develop skills in communicating and applying geographical knowledge; and
- Make informed judgements and sound decisions through the analysis, synthesis and evaluation of geographical information.

Learning Outcomes

Knowledge and Understanding
The syllabus intends for students to develop knowledge of:

- Components of physical and human environments at local, regional and global scales
- Diverse spatial patterns of physical and human phenomena
- Relationships and interactions between and within physical and human phenomena at local, regional and global scales
- Varying spatial and temporal changes in physical and human environments; and
- Different approaches through which challenges faced can be managed by local, regional and global communities.

Skills
The syllabuses intend for students to develop the skills to:

- Ask relevant geographical questions and work effectively in teams to collect geographical information from both primary and secondary sources
- Extract relevant information from geographical data
- Interpret and recognise patterns in geographical data and deduce relationships
- Organise and present geographic information in a coherent way; and
- Analyse, evaluate and synthesise geographical data to make informed and sound decisions.

Values
Through their geographical training, students should develop:

- Judgements on values and attitudes in the use and management of resources
- A sense of appreciation, care and responsibility for the quality of the environment; and
- Respect and sensitivity towards the attitudes, values and beliefs of people in different human environments.

1.4 THINKING GEOGRAPHICALLY

Geography provides students with a particular set of perspectives to make sense of Singapore and the complex and dynamically changing world. Central to understanding geography's way of thinking/perspective are a number of key concepts such as space, place scale, physical and human processes, environmental and cultural diversity, and interdependence (see Figure 3).

These six key concepts that underpin the study of Geography in the Geography and Geography Elective syllabuses provide valuable insights into the nature of the subject because of their breadth of application to the content studied and the extent to which they are linked to other significant ideas within the subject. The key concepts give the subject greater coherence and a stronger narrative. As students learn Geography, they will develop their

understanding of these concepts and associated terms. Growing familiarity with these concepts will help students to put on the geographical lens; that is to think geographically.

Figure 3: Six Key Geographical Concepts

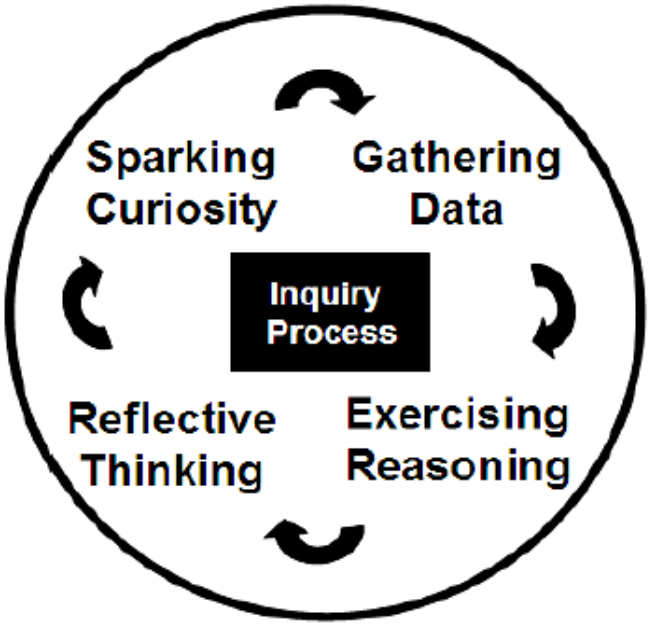
1	**Space**
	• Know the location and distribution of physical features and human activities • Appreciate how and why the physical features and human activities are changing and their implications. • Understand the interactions between places and the patterns of networks created by movements within these places.
2	**Place**
	• Understand that every place has a unique set of physical and human characteristics. • Understand the dynamic nature of places, and the opportunities and challenges associated with them.
3	**Scale**
	• Appreciate different scales, from local to national and international. • Make links between scales to develop geographical understanding of issues confronting different societies.
4	**Physical and human processes**
	• Understand the complexity of physical processes and recognise the opportunities and challenges associated with these processes. • Understand how sequences of events and activities in the physical and human worlds are part of our dynamic planet and changing world.
5	**Environmental and cultural diversity**
	• Appreciate the differences and similarities between people, places, environments and cultures. • Appreciate the variety of people, places, environments and cultures in our varied and changing world.
6	**Interdependence**
	• Explore the socio-cultural, economic and environmental connections between places and earth's four spheres. • Understand the interrelationships and interconnections when studying change in physical features and human activities at all scales.

2. PEDAGOGY

2.1 INQUIRY AS RECOMMENDED PEDAGOGY

Geography explores the interaction between people and their environment in order to appreciate complexities of the human experience and rapid change in today's world. Integral to this exploration process is learning through inquiry. Inquiry is recommended for the learning of concepts, skills and exploration of topics. It is also a common pedagogy recommended for all humanities syllabuses including Geography and Geography Elective. The Humanities Inquiry Approach comprises three key areas: elements of inquiry, process of inquiry (see Figure 4) and culture of inquiry.

Figure 4: Inquiry Process



In Geography, geographical inquiry encourages questioning, investigation and critical thinking about issues affecting the environment and people's lives, now and in the future. It comprises four aspects of sparking curiosity, gathering data, exercising reasoning, and reflective thinking. It involves the use of stimuli such as photographs to trigger curiosity among students and prompt students to ask geographical questions or formulate hypotheses. Students are then introduced to the necessary skills to collect data and are guided in data analysis, data presentation and reflection.

Sparking Curiosity

The subject matter for inquiry is introduced in a manner that stimulates curiosity about the issues and ideas. Students are guided to activate their prior knowledge about the issue. The stimulus materials need to be able to challenge students' assumptions and habitual responses, invite consideration of alternative hypotheses, and arouse intellectual curiosity and imagination. The stimulus material could be built around an exploration of general

concepts or ideas that tend to be common yet contestable. Students then identify the gaps in their understanding and carry out their investigation about the issue or idea.

Gathering Data

Students embark on the journey of investigation to collect the data and evidence they need to address the gaps in their understanding about the inquiry issue. Having developed a plan to do so, students may explore a variety of data sources such as print and non-print materials, statistics, maps, objects, texts, interviews and audio-visual materials. Students will have to make decisions about the selection of relevant and useful evidence, as well as the classification and sequencing of data to enrich their understanding about the issue.

Exercising Reasoning

As students systematically organise the data they have collected, they will need to exercise evidence-based reasoning to make connections between the various sources of data they have in order to develop informed opinions about the issue. Students will engage in the description, explanation as well as the comparison of various data to develop a better understanding of issue at hand. Sound reasoning involves questioning assumptions, exploring agreement and disagreement, giving reasons, considering implications, determining reliability and usefulness, evaluating and applying criteria. The process of reasoning thus allows students to engage in deliberation with self and others, review their existing knowledge and perspectives to develop more comprehensive understanding of the issue, and thereby construct new knowledge for themselves.

Reflective Thinking

Reflecting on their learning is an important aspect of the inquiry process that helps students to examine their own thinking, feeling and doing. Students will learn to critically evaluate their process of inquiry, including their data sources, methods of investigation, opinions and judgments, as well as the new knowledge they have constructed for themselves. In doing so, they become self-reflective thinkers who reflect on assumptions, biases, values and beliefs that undergird their prior knowledge and personal responses. They thereby develop metacognitive awareness in both the cognitive and affective domains.

3. CONTENT

3.1 OVERVIEW OF SYLLABUS CONTENT

The Geography and Geography Elective syllabuses focus on current geographical topics and associated issues designed to motivate students to study Geography. Each syllabus is structured around three major themes, namely "Our Dynamic Planet", "Our Changing World" and "Geographical Skills and Investigations". The theme 'Our Dynamic Planet' focuses on physical geography whilst 'Our Changing World' focuses on human geography. The third theme 'Geographical Skills and Investigations' comprises topographical map reading, geographical data and techniques as well as geographical investigations.

Geography Syllabuses

In O-Level Geography, the three physical geography topics are *Coasts*, *Living with Tectonic Hazards* and *Weather and Climate* while the three human geography topics are *Tourism*, *Food Resources* and *Health and Diseases*.

In N(A)-Level Geography, the two physical geography topics are *Coasts* and *Living with Tectonic Hazards* while the two human geography topics are *Tourism* and *Food Resources*. Figure 5 shows an overview of the themes and topics for the O and N(A) Level Geography syllabuses.

Figure 5: Overview of O and N(A) Level Geography Syllabuses

	O Level	N(A) Level
Theme 1: Our Dynamic Planet (Physical Geography)		
1. Coasts – Should coastal environments matter?	✔	✔
2. Living with Tectonic Hazards – Risk or opportunity?	✔	✔
3. Variable Weather and Changing Climate – A continuing challenge?	✔	
Theme 2: Our Changing World (Human Geography)		
4. Global Tourism – Is tourism the way to go?	✔	✔
5. Food Resources – Is technology a panacea for food shortage?	✔	✔
6. Health and Diseases – Are we more vulnerable than before?	✔	
Theme 3: Geographical Skills and Investigations		
7. Topographical map reading skills	✔	✔
8. Geographical data and techniques	✔	✔
9. Geographical Investigations	✔	✔

Geography Elective Syllabuses

As a half-component of the Combined Humanities subject, the O and N(A)-Level Geography Elective syllabuses, have 50% of the content of the O and N(A)-level Geography syllabuses. Content of the Geography Elective syllabuses is reduced by removing the third Key Question for the topics of *Variable Weather and Changing Climate* and *Food Resources* for O-Level Geography Elective syllabus and *Plate Tectonics* and *Variable Weather and Changing Climate*

for N(A) Level Geography Elective syllabus. In these topics where the third Key Questions are omitted, attempts have been made to ensure that the content covered in Key Questions 1 and 2 would provide some scope for students to inquire into the issue.

Like the Geography syllabuses, each of the O and N(A)-Level Geography Elective syllabuses has three content themes, namely Our Dynamic Planet (Physical Geography)*;* Our Changing World (Human Geography); and Geographical Skills and Investigations.

In O-Level Geography Elective, the two physical geography topics are *Living with Tectonic Hazards* and *Weather and Climate* while the two human geography topics are *Tourism* and *Food Resources*. In N(A)-Level Geography Elective, the syllabus consists of three topics, namely, *Living with Tectonic Hazards, Weather and Climate* and *Tourism*. Figure 6 shows an overview of the themes and topics for the O and N(A) Level Geography Elective syllabuses.

Figure 6: Overview of O and N(A) Level Geography Elective Syllabuses

	O Level	N(A) Level
Theme 1: Our Dynamic Planet (Physical Geography)		
1. Living with Tectonic Hazards – Risk or opportunity?	✔	✔ (only KQs 1 & 2)
2. Variable Weather and Changing Climate – A continuing challenge?	✔ (only KQs 1 & 2)	✔ (only KQs 1 & 2)
Theme 2: Our Changing World (Human Geography)		
3. Global Tourism – Is tourism the way to go?	✔	✔
4. Food Resources – Is technology a panacea for food shortage?	✔ (only KQs 1 & 2)	
Theme 3: Geographical Skills and Investigations		
5. Topographical map reading skills	✔	✔
6. Geographical data and techniques	✔	✔
7. Geographical Investigations	✔	✔

Note: Each topic in the O and N(A)-Level Geography has three key questions. However, this is not always the case for the O and N(A)-Level Geography Elective syllabuses.

3.2 CONTENT FOR SYLLABUS 2236 GCE O-LEVEL GEOGRAPHY SYLLABUS	
Topic 1: Coasts – Should coastal environments matter?	
Key Question 1: How and why are coastal environments different and dynamic?	
Learning Outcomes	**Content**
Students will be able to: • Explain the dynamic nature of coastal environments • Explain how waves are generated and the factors influencing wave energy • Explain wave refraction and the processes which occur when waves break • Describe the different types of waves and their associated coastal environments • Explain the different coastal processes • Describe and explain the formation of cliffs, headlands, caves, arches, stacks and shore platforms • Describe and explain the formation of bays, beaches, spits and tombolos	A) Knowledge • Definition of coast • Coastal environments are dynamic and changing due to: waves, currents, tides, geology, human activities, ecosystem type (mangrove, coral) • Waves are generated when there is a transfer of energy from wind to water surface • Wave energy depends on the following factors: fetch, wind speed, wind duration • Wave refraction and associated concentration and dissipation of wave energy • Processes which occur when waves break: swash, backwash • Types of waves and wave environments: constructive and destructive • Coastal processes – Erosion by waves (abrasion, hydraulic action, attrition and solution) – Transportation through longshore drift – Deposition • Formation of coastal landforms – Erosional landforms (cliffs, headlands, caves, arches, stacks, shore platforms, bays) – Depositional landforms (beaches, spits and tombolos) B) Skills • Identify coastal landforms and features shown in topographical maps, photographs and sketches • Draw and label a field sketch of a coastal area shown in a photograph • Investigate how wave type influences beach profile and how longshore drift forms characteristic landforms • Measure beach slope, wave height, wave length, wave frequency and beach profile • Analyse data and derive relationships among variables (between wave steepness and beach slope, grain size and beach slope) • Calculate wave steepness using wave height and wave length data • Plot and label beach profile

Key Question 2: Why are coastal areas valuable? (*Focus is on tropical coasts)	
• Describe four key ecosystem services obtainable from coastal ecosystems • Explain how the distinctive characteristics of coastal areas support a variety of human activities • Describe the global distribution and characteristics of coral reef ecosystem • Explain the value of coral reef ecosystem in the coastal environment • Discuss the issues surrounding the destruction of coral reef ecosystem • Describe the global distribution and characteristics of mangrove ecosystem • Explain the value of the mangrove ecosystem in the coastal environment • Discuss the issues surrounding the destruction of mangrove ecosystem • Identify and explain the threats to coastal areas	A) Knowledge • Human activities in coastal areas with reference to an example for each of the following: – Fisheries and aquaculture – Housing and transportation – Tourism and recreation • Coral reefs – Environmental conditions for growth – Distribution in the tropics – Value – Pressures • Mangroves – Environmental conditions for growth – Distribution in the tropics – Adaptations – Value – Pressures B) Skills • Locate major coral reef and mangrove areas on the world map • Identify the characteristics of mangroves shown in photographs and sketches that help them to adapt to the coastal environment • Identify the different kinds of human activities in coastal areas shown in maps, photographs and sketches
Key Question 3: How can we manage coastal areas in a sustainable manner?	
• Explain how coastal areas can be managed in a sustainable manner • Evaluate the effectiveness of coastal protection measures	A) Knowledge • Sustainable management of coastal areas – Laws and regulations – Measures to protect the coast from erosion (soft and hard engineering) B) Skills • Identify engineering measures adopted to mitigate coastal erosion in the field and shown in photographs and sketches

	• Analyse satellite images on changes in selected coastlines over two time periods
Topic 2: Living With Tectonic Hazards – Risk or opportunity?	
Key Question 1: Why are some areas more prone to tectonic hazards?	
Learning Outcomes	**Content**
Students will be able to: • Outline the main types of natural hazards • Describe the internal structure of the Earth • Explain the movement of plates • Describe the global distribution of tectonic plates and types of plate boundaries	A) Knowledge • Definition of natural hazards and the main ways they may be classified: climate-related, tectonic hazards • Internal structure of the Earth – Layered structure: core, mantle, continental crust and oceanic crust – Characteristics of each layer: thickness, solid or liquid state • Movement of crustal plates driven by the pull of subducting plates and convection currents circulating within the mantle • Names, types and locations of major plates and plate boundaries in the world • Types of plate boundaries and examples: – Divergent: oceanic-oceanic, continental-continental – Convergent: oceanic-oceanic, continental-continental, oceanic-continental – Transform B) Skills • Draw and annotate a diagram showing the internal structure of the Earth • Identify and label major plates and the boundary types on maps • Draw labelled diagrams showing the different types of movements taking place at plate boundaries
Key Question 2: What landforms and associated tectonic phenomena are found at plate boundaries?	
• Discuss how plate movements influence the general distribution of landforms and associated phenomena • Describe the landforms and phenomena associated with plate movements • Explain the causes of landforms and phenomena associated with plate movements	A) Knowledge • Plate movements and associated landforms – Divergent: Rift valleys and block mountains – Convergent: Fold mountains – Divergent and Convergent: Volcanoes • Phenomena and their causes: earthquakes, tsunamis, volcanic eruptions • Structure of volcanoes: crater, caldera, vent, magma chamber • Characteristics and formation of volcanoes: shield volcano, stratovolcano, viscosity of lava

• Describe the structure of volcanoes • Explain the characteristics of volcanoes • Explain the formation of volcanoes • Discuss the benefits and risks of living in volcanic areas • Discuss the impact of earthquakes on people living in areas prone to this natural hazard	• Benefits of living in volcanic areas: fertile soil, precious stones and minerals, tourism and geothermal energy • Risks of living in volcanic areas: massive destruction by volcanic materials, pollution • Risks associated with living in earthquake zones: disruption of services, landslides, destruction of properties and infrastructure, loss of lives, tsunami B) Skills • Analyse maps and photographs of major tectonic landforms and phenomena to derive the relationship between their distribution patterns and plate boundaries • Draw an annotated cross-section of a volcano • Draw labelled diagrams to show the formation of a fold mountain, a rift valley, a block mountain and a volcano
Key Question 3: How do people prepare for and respond to earthquakes?	
• Discuss the responses of people to earthquakes and tsunamis • Assess the effectiveness of strategies in mitigating and responding to the effects of earthquakes and tsunamis	A) Knowledge • People may respond to natural hazards in several ways: preparedness measures, short-term responses, long-term responses B) Skills • Examine before and after satellite images and aerial photographs of a place affected by an earthquake or tsunami to identify and analyse the changes that have occurred
Topic 3: Variable Weather and Changing Climate – A continuing challenge?	
Key Question 1: Why do different places experience different weather and climate?	
Learning Outcomes	**Content**
Students will be able to: • Differentiate between weather and climate • Explain the daily and seasonal variations in temperature at a particular location • Compare and explain the variations in temperature between different locations • Explain the differences in relative humidity in different locations	A) Knowledge • Definition of weather and climate • Elements of weather: temperature, relative humidity, clouds and rainfall, pressure and winds • Temperature – Factors influencing the temperature of locations: latitude, altitude, distance from the sea, cloud cover • Relative humidity, clouds and rainfall – Relative humidity – Formation of rain: convectional and relief rain

• Explain the formation of convectional rain and relief rain • Explain how coastal temperatures are moderated by land and sea breezes • Explain the formation of monsoon winds • Describe and explain the distribution and characteristics of equatorial, monsoon and cool temperate climates • Describe and explain the weather and climate of Singapore with reference to rainfall, relative humidity and temperature	• Pressure and winds – Pressure and movement of air – Wind systems: land and sea breezes, monsoon winds • Equatorial climate • Monsoon climate • Cool temperate climate (marine west-coast) B) Skills • Use of appropriate instruments to gather weather data (temperature, rainfall, air pressure, wind and relative humidity) • Make calculations of weather data (annual range, diurnal range, mean monthly, relative humidity) • Use appropriate graphs and diagrams to represent weather data
Key Question 2: What is happening to the Earth's climate?	
• Describe and explain climate change since 1880 • Explain the greenhouse effect • Discuss the natural causes of recent climate change • Explain how human activities lead to enhanced greenhouse effect • Discuss the impact of climate change • Describe the responses to climate change	A) Knowledge • Changes in climate – Global records since 1881 show a significant, but irregular temperature rise of 0.3°C to 0.6°C. – Global cooling was recorded after WWII for several decades because of industrial pollution and volcanic activity (global dimming). – Global warming over the last century: world is warming on average by 0.74°C, with most of that since 1970s – Global temperatures in the last decade reached the highest levels on record. • Greenhouse effect is a natural process by which greenhouse gases trap heat in the atmosphere • Natural causes of recent climatic change: variations in solar output, volcanic eruptions • Anthropogenic factors leading to enhanced greenhouse effect – Deforestation and associated increase in atmospheric carbon dioxide – Changing land use and associated increase in greenhouse gases • Impacts of climate change – Sea level rise – More frequent extreme weather events

	– Spread of some infectious insect-borne diseases – Lengthen the growing season in certain regions • Responses and challenges to climate change – International community (Kyoto Protocol) – Nations (Singapore) B) Skills • Extract information, describe trends and draw conclusions from graphs on temperature and greenhouse gases
Key Question 3: Is the weather becoming more extreme? (*Focus is on tropical cyclones)	
• Describe the location and characteristics of tropical cyclones • Discuss the impact of tropical cyclones on human lives and the environment • Evaluate the effectiveness of measures adopted to mitigate and respond to the effects of tropical cyclones	A) Knowledge • Tropical cyclones • Occurrence of tropical cyclones • Characteristics of tropical cyclones – Weather systems developing over tropical or subtropical waters – Strong winds – Low pressure with clear skies and calm winds at the eye • Hazards associated with tropical cyclones: storm surges, wind damage, torrential rains • Impacts of tropical cyclones: – Physical – Economic – Social • Emergency action • Mitigation measures – Prediction and warning – Land use control – Reducing vulnerability of infrastructure B) Skills • Track the path of a selected tropical cyclone from satellite images • Locate selected tropical cyclones on a map and discuss their impact
Topic 4: Global Tourism – Is tourism the way to go?	
Key Question 1: How does the nature of tourism vary from place to place?	

Learning Outcomes	Content
Students will be able to: • Describe and give examples of different types of tourism • Explain why tourist activities are different at different places • Discuss the roles of different groups in promoting tourism	A) Knowledge • Tourists are people who travel and stay away from their normal place of residence for more than 24 hours • Tourism may be categorised according to types of attractions offered to tourists. Different places and environments provide different opportunities for tourist activities: places of scenic beauty, places with good facilities, places with rich culture, places of conflicts • Role of different groups in tourism: government, media and international organizations B) Skills • Classify key global tourist attractions by type • With reference to a map, describe distribution of key global tourist attractions by type • Identify key features of specific tourist sites and associated tourist activities
Key Question 2: Why has tourism become a global phenomenon?	
• Describe the trends of both domestic tourism and international tourism • Describe the changing nature of global tourism • Explain the growth of global tourism • Explain why tourism is subject to fluctuations	A) Knowledge • Trends in the global tourism industry in terms of destinations, country of origin and tourist dollars for: domestic tourism, international tourism • Evolution of mass tourism in the form of the package holiday to niche tourism • Development of short haul destinations and the growth of long-haul tourism • Reasons for the growth of global tourism – Developments in technology – Demand factors arising from changing profile of tourists – Destination factors • Impact of events that hinder the growth of tourism: disasters, recessions, political situations and diseases B) Skills • Extract information on trends in global tourist industry from graphs or tables • Extract information on factors affecting growth of the global tourist industry from maps, graphs or tables • Analyse tourist revenues using diagrams such as bar graph and pie chart • Analyse top tourist destinations and tourist origins for a selected country using flow maps and pie charts

Key Question 3: Developing tourism at what cost?	
• Assess the impact of tourism on a country • Explain how tourism can be made sustainable • Discuss the roles of various groups in taking care of the tourist areas	A) Knowledge • Impact of the growth of tourism on a country – Economic: advantages and disadvantages – Socio-cultural: advantages and disadvantages – Environmental: advantages and disadvantages • Managing the impact of tourism – Conserve fragile environments – Promote sustainable tourism through laws and regulation and support from local population – Responsibilities of various groups in conserving and protecting tourist areas: local communities, visitors, tour operators, planning authorities, non-governmental organisations B) Skills • Extract information from sources regarding tourism in a selected country • Design questionnaires
Topic 5: Food Resources – Is technology a panacea for food shortage?	
Key Question 1: How and why has food consumption patterns changed since 1960s?	
Learning Outcomes	**Content**
Students will be able to: • Describe variations in global food consumption patterns between DCs and LDCs over time • Describe the changing food preferences in DCs and LDCs • Explain why variations exist and persist in food consumption between DCs and LDCs	A) Knowledge • Variations in global food consumption patterns between DCs and LDCs over time, in terms of: indicators of food consumption, changing food preferences • Reasons for the growth and variations in food consumption: economic, socio-cultural, political • Impact of inadequate food consumption on individuals and countries: health, economic, political, social • Impact of excess food consumption on individuals and countries: health, economic, social B) Skills • Compare food consumption levels between DCs and LDCs shown in maps or graphs • Compare how food consumption patterns are influenced by changes in income
Key Question 2: What are the trends and challenges in production of food crops?	

• Describe and explain the trends in production of food crops since 1960s • Discuss the factors affecting the intensity of food production • Discuss the effects of intensification of food production activities on water and soil quality • Discuss the causes of food shortage	A) Knowledge • Trends in production of food crop[s like rice and wheat from 1960s: increased intensity of production of food crops • Factors affecting the intensity of food production: physical, economic, political, technological advances • Challenges associated with intensification of production of crops from 1960s: effects of use of irrigation and chemicals on water and soil quality • Causes of food shortage: physical, political, economic, social B) Skills • Identify areas on maps where major crops (rice and wheat) are grown • Describe how interaction between physical and human environments affects food production from maps and photographs • With reference to a given resource, describe the range of products produced by an agri-business and its spatial network
Key Question 3: How can the problem of food shortage be addressed?	
• Explain strategies adopted to alleviate the problem of food shortage • Evaluate the effectiveness of technological strategies to solve the problem of food shortage	A) Knowledge • Strategies to overcome food shortage: technological (storage, farming technology, biotechnology), agricultural (multiple cropping and crop rotation, water and soil conservation, lease of farmland to other countries), social (support local farmers, population control), political/economic (food programmes and aid assistance, agricultural policies) B) Skills • Interpret data on countries with inadequate food supply from maps and graphs • Interpret variations in food shortage within a country using maps, graphs, texts and diagrams
Topic 6: Health and Diseases – Are we more vulnerable than before?	
Key Question 1: What are the global patterns of health and diseases?	
Learning Outcomes	**Content**
Students will be able to: • Describe how the health of people varies between DCs and LDCs	A) Knowledge • Variations in health of people between DCs and LDCs in terms of the following indicators: infant mortality rate, life expectancy

• Explain the variations in the health of people between DCs and LDCs	• Factors accounting for variations in health of people in DCs and LDCs: social, economic, environmental • Variations in types of diseases between DCs and LDCs – Degenerative diseases: main causes of death in DCs, global distribution (e.g. heart attack, cancer, diabetes) – Infectious diseases: main causes of death in LDCs, global distribution (e.g. tuberculosis, malaria, dengue fever, HIV/AIDS) B) Skills • Construct pie-charts to show the types of diseases commonly found in DCs and LDCs, using information from a given source • Draw correlations between infant mortality rate and life expectancy • Interpret variations in types of diseases between DCs and LDCs using maps, graphs, texts and diagrams
Key Question 2: What influences the spread and impact of infectious diseases? (*Focus is on malaria and HIV/AIDS)	
• Compare and give examples of epidemic and pandemic outbreaks at different times in the past, as shown in data provided • Describe and explain the transmission of malaria • Describe the spread of malaria in the world • Describe and explain the extent of spread of malaria in a selected country in Asia • Discuss the impact of malaria in a selected country • Describe and explain the transmission of HIV/AIDS • Describe the spread of HIV/AIDS in the world	A) Knowledge • Definition and examples of major disease outbreaks in the past: epidemic (e.g. flu outbreak of 1918), pandemic (e.g. 2003 Severe Acute Respiratory Syndrome (SARS)) <u>Malaria</u> • Mode of transmission and geographical spread of the disease • Pattern of spread of disease: expansion diffusion • Vulnerable groups: pregnant women and children • Factors contributing to spread: social, economic, environmental • Impacts of malaria: social, economic <u>HIV/AIDS epidemic in the world and in Sub-Saharan Africa</u> • Mode of transmission and geographical spread of the disease • Pattern of spread of disease: expansion and relocation diffusion • Vulnerable groups: babies and females • Factors contributing to spread: social, economic, environmental • Impacts of malaria: social, economic B) Skills • Compare the spread of infectious diseases (e.g. malaria, HIV/AIDS) between LDCs and DCs

• Describe and explain the extent of spread of HIV/AIDS in a selected country • Discuss the impact of HIV/AIDS in a selected country	• Locate and describe the spread of malaria or HIV/AIDS over time
Key Question 3: How can we manage the current and future spread of infectious diseases?	
• Discuss the challenges faced in managing the spread of infectious diseases • Explain the re-emergence of malaria in several countries in the world • Discuss measures that individuals, governments, and organisations can take to manage the spread of infectious diseases • Assess the effectiveness of measures taken by a country to contain the spread of the disease	A) Knowledge • Challenges in managing the spread of malaria: socio-economic (limitations of healthcare, population movement due to efficient transport and communications), environmental (effects of monsoons, effects of climate change) • Challenges in managing the spread of HIV/AIDS: socio-economic (lifestyle choices, difficulties in HIV detection, social stigma, high cost of antiretroviral therapy, population movement across borders and along highways) • Role of different groups in managing outbreak and spread of infectious diseases: individuals (awareness and practice of precautionary measures), communities, government (implementation of precautionary and mitigation measures), international organisations such as World Health Organisation and other non-governmental organisations B) Skills • Locate and describe the spread of emerging and re-emerging infectious diseases over time

3.3 CONTENT FOR SYLLABUS 2246 GCE N(A)-LEVEL GEOGRAPHY SYLLABUS

Topic 1: Coasts – Should coastal environments matter?

Key Question 1: How and why are coastal environments different and dynamic?

Learning Outcomes	**Content**
Students will be able to: • Explain the dynamic nature of coastal environments • Explain how waves are generated and the factors influencing wave energy • Explain wave refraction and the processes which occur when waves break	A) Knowledge • Definition of coast • Coastal environments are dynamic and changing due to: waves, currents, tides, geology, human activities, ecosystem type (mangrove, coral) • Waves are generated when there is a transfer of energy from wind to water surface • Wave energy depends on the following factors: fetch, wind speed, wind duration • Wave refraction and associated concentration and dissipation of wave energy

• Describe the different types of waves and their associated coastal environments • Explain the different coastal processes • Describe and explain the formation of cliffs, headlands, caves, arches, stacks and shore platforms • Describe and explain the formation of bays, beaches, spits and tombolos	• Processes which occur when waves break: swash, backwash • Types of waves and wave environments: constructive and destructive • Coastal processes – Erosion by waves (abrasion, hydraulic action, attrition and solution) – Transportation through longshore drift – Deposition • Formation of coastal landforms – Erosional landforms (cliffs, headlands, caves, arches, stacks, shore platforms, bays) – Depositional landforms (beaches, spits and tombolos) B) Skills • Identify coastal landforms and features shown in topographical maps, photographs and sketches • Draw and label a field sketch of a coastal area shown in a photograph • Investigate how wave type influences beach profile and how longshore drift forms characteristic landforms • Measure beach slope, wave height, wave length, wave frequency and beach profile • Analyse data and derive relationships among variables (between wave steepness and beach slope, grain size and beach slope) • Calculate wave steepness using wave height and wave length data • Plot and label beach profile
Key Question 2: Why are coastal areas valuable? (*Focus is on tropical coasts)	
• Describe four key ecosystem services obtainable from coastal ecosystems • Explain how the distinctive characteristics of coastal areas support a variety of human activities • Describe the global distribution and characteristics of coral reef ecosystem • Explain the value of coral reef ecosystem in the coastal environment	A) Knowledge • Human activities in coastal areas with reference to an example for each of the following: – Fisheries and aquaculture – Housing and transportation – Tourism and recreation • Coral reefs – Environmental conditions for growth – Distribution in the tropics – Value – Pressures

• Discuss the issues surrounding the destruction of coral reef ecosystem • Describe the global distribution and characteristics of mangrove ecosystem • Explain the value of the mangrove ecosystem in the coastal environment • Discuss the issues surrounding the destruction of mangrove ecosystem • Identify and explain the threats to coastal areas	• Mangroves – Environmental conditions for growth – Distribution in the tropics – Adaptations – Value – Pressures B) Skills • Locate major coral reef and mangrove areas on the world map • Identify the characteristics of mangroves shown in photographs and sketches that help them to adapt to the coastal environment • Identify the different kinds of human activities in coastal areas shown in maps, photographs and sketches
Key Question 3: How can we manage coastal areas in a sustainable manner?	
• Explain how coastal areas can be managed in a sustainable manner • Evaluate the effectiveness of coastal protection measures	A) Knowledge • Sustainable management of coastal areas – Laws and regulations – Measures to protect the coast from erosion (soft and hard engineering) B) Skills • Identify engineering measures adopted to mitigate coastal erosion in the field and shown in photographs and sketches • Analyse satellite images on changes in selected coastlines over two time periods
Topic 2: Living With Tectonic Hazards – Risk or opportunity?	
Key Question 1: Why are some areas more prone to tectonic hazards?	
Learning Outcomes	**Content**
Students will be able to: • Outline the main types of natural hazards • Describe the internal structure of the Earth • Explain the movement of plates	A) Knowledge • Definition of natural hazards and the main ways they may be classified: climate-related, tectonic hazards • Internal structure of the Earth – Layered structure: core, mantle, continental crust and oceanic crust – Characteristics of each layer: thickness, solid or liquid state

• Describe the global distribution of tectonic plates and types of plate boundaries	• Movement of crustal plates driven by the pull of subducting plates and convection currents circulating within the mantle • Names, types and locations of major plates and plate boundaries in the world • Types of plate boundaries and examples: – Divergent: oceanic-oceanic, continental-continental – Convergent: oceanic-oceanic, continental-continental, oceanic-continental – Transform B) Skills • Draw and annotate a diagram showing the internal structure of the Earth • Identify and label major plates and the boundary types on maps • Draw labelled diagrams showing the different types of movements taking place at plate boundaries
Key Question 2: What landforms and associated tectonic phenomena are found at plate boundaries?	
• Discuss how plate movements influence the general distribution of landforms and associated phenomena • Describe the landforms and phenomena associated with plate movements • Explain the causes of landforms and phenomena associated with plate movements • Describe the structure of volcanoes • Explain the characteristics of volcanoes • Explain the formation of volcanoes • Discuss the benefits and risks of living in volcanic areas • Discuss the impact of earthquakes on people living in areas prone to this natural hazard	A) Knowledge • Plate movements and associated landforms – Divergent: Rift valleys and block mountains – Convergent: Fold mountains – Divergent and Convergent: Volcanoes • Phenomena and their causes: earthquakes, tsunamis, volcanic eruptions • Structure of volcanoes: crater, caldera, vent, magma chamber • Characteristics and formation of volcanoes: shield volcano, stratovolcano, viscosity of lava • Benefits of living in volcanic areas: fertile soil, precious stones and minerals, tourism and geothermal energy • Risks of living in volcanic areas: massive destruction by volcanic materials, pollution • Risks associated with living in earthquake zones: disruption of services, landslides, destruction of properties and infrastructure, loss of lives, tsunami B) Skills • Analyse maps and photographs of major tectonic landforms and phenomena to derive the relationship between their distribution patterns and plate boundaries • Draw an annotated cross-section of a volcano

	• Draw labelled diagrams to show the formation of a fold mountain, a rift valley, a block mountain and a volcano
Key Question 3: How do people prepare for and respond to earthquakes?	
• Discuss the responses of people to earthquakes and tsunamis • Assess the effectiveness of strategies in mitigating and responding to the effects of earthquakes and tsunamis	A) Knowledge • People may respond to natural hazards in several ways: preparedness measures, short-term responses, long-term responses B) Skills • Examine before and after satellite images and aerial photographs of a place affected by an earthquake or tsunami to identify and analyse the changes that have occurred
Topic 3: Global Tourism – Is tourism the way to go?	
Key Question 1: How does the nature of tourism vary from place to place?	
Learning Outcomes	**Content**
Students will be able to: • Describe and give examples of different types of tourism • Explain why tourist activities are different at different places • Discuss the roles of different groups in promoting tourism	A) Knowledge • Tourists are people who travel and stay away from their normal place of residence for more than 24 hours • Tourism may be categorised according to types of attractions offered to tourists. Different places and environments provide different opportunities for tourist activities: places of scenic beauty, places with good facilities, places with rich culture, places of conflicts • Role of different groups in tourism: government, media and international organizations B) Skills • Classify key global tourist attractions by type • With reference to a map, describe distribution of key global tourist attractions by type • Identify key features of specific tourist sites and associated tourist activities
Key Question 2: Why has tourism become a global phenomenon?	
• Describe the trends of both domestic tourism and international tourism • Describe the changing nature of global tourism • Explain the growth of global tourism	A) Knowledge • Trends in the global tourism industry in terms of destinations, country of origin and tourist dollars for: domestic tourism, international tourism • Evolution of mass tourism in the form of the package holiday to niche tourism • Development of short haul destinations and the growth of long-haul tourism • Reasons for the growth of global tourism

• Explain why tourism is subject to fluctuations	– Developments in technology – Demand factors arising from changing profile of tourists – Destination factors • Impact of events that hinder the growth of tourism: disasters, recessions, political situations and diseases B) Skills • Extract information on trends in global tourist industry from graphs or tables • Extract information on factors affecting growth of the global tourist industry from maps, graphs or tables • Analyse tourist revenues using diagrams such as bar graph and pie chart • Analyse top tourist destinations and tourist origins for a selected country using flow maps and pie charts
Key Question 3: Developing tourism at what cost?	
• Assess the impact of tourism on a country • Explain how tourism can be made sustainable • Discuss the roles of various groups in taking care of the tourist areas	A) Knowledge • Impact of the growth of tourism on a country – Economic: advantages and disadvantages – Socio-cultural: advantages and disadvantages – Environmental: advantages and disadvantages • Managing the impact of tourism – Conserve fragile environments – Promote sustainable tourism through laws and regulation and support from local population – Responsibilities of various groups in conserving and protecting tourist areas: local communities, visitors, tour operators, planning authorities, non-governmental organisations B) Skills • Extract information from sources regarding tourism in a selected country • Design questionnaires
Topic 4: Food Resources – Is technology a panacea for food shortage?	
Key Question 1: How and why has food consumption patterns changed since 1960s?	
Learning Outcomes	**Content**

Students will be able to: • Describe variations in global food consumption patterns between DCs and LDCs over time • Describe the changing food preferences in DCs and LDCs • Explain why variations exist and persist in food consumption between DCs and LDCs	A) Knowledge • Variations in global food consumption patterns between DCs and LDCs over time, in terms of: indicators of food consumption, changing food preferences • Reasons for the growth and variations in food consumption: economic, socio-cultural, political • Impact of inadequate food consumption on individuals and countries: health, economic, political, social • Impact of excess food consumption on individuals and countries: health, economic, social B) Skills • Compare food consumption levels between DCs and LDCs shown in maps or graphs • Compare how food consumption patterns are influenced by changes in income
Key Question 2: What are the trends and challenges in production of food crops?	
• Describe and explain the trends in production of food crops since 1960s • Discuss the factors affecting the intensity of food production • Discuss the effects of intensification of food production activities on water and soil quality • Discuss the causes of food shortage	A) Knowledge • Trends in production of food crop[s like rice and wheat from 1960s: increased intensity of production of food crops • Factors affecting the intensity of food production: physical, economic, political, technological advances • Challenges associated with intensification of production of crops from 1960s: effects of use of irrigation and chemicals on water and soil quality • Causes of food shortage: physical, political, economic, social B) Skills • Identify areas on maps where major crops (rice and wheat) are grown • Describe how interaction between physical and human environments affects food production from maps and photographs • With reference to a given resource, describe the range of products produced by an agri-business and its spatial network
Key Question 3: How can the problem of food shortage be addressed?	
• Explain strategies adopted to alleviate the problem of food shortage	A) Knowledge • Strategies to overcome food shortage: technological (storage, farming technology, biotechnology), agricultural (multiple cropping and crop rotation, water and soil conservation, lease of farmland to other countries), social (support local farmers,

• Evaluate the effectiveness of technological strategies to solve the problem of food shortage	population control), political/economic (food programmes and aid assistance, agricultural policies) B) Skills • Interpret data on countries with inadequate food supply from maps and graphs • Interpret variations in food shortage within a country using maps, graphs, texts and diagrams

3.4 CONTENT FOR SYLLABUS 2267 GCE O-LEVEL GEOGRAPHY ELECTIVE SYLLABUS

Topic 1: Living With Tectonic Hazards – Risk or opportunity?

Key Question 1: Why are some areas more prone to tectonic hazards?

Learning Outcomes	Content
Students will be able to: • Outline the main types of natural hazards • Describe the internal structure of the Earth • Explain the movement of plates • Describe the global distribution of tectonic plates and types of plate boundaries	A) Knowledge • Definition of natural hazards and the main ways they may be classified: climate-related, tectonic hazards • Internal structure of the Earth – Layered structure: core, mantle, continental crust and oceanic crust – Characteristics of each layer: thickness, solid or liquid state • Movement of crustal plates driven by the pull of subducting plates and convection currents circulating within the mantle • Names, types and locations of major plates and plate boundaries in the world • Types of plate boundaries and examples: – Divergent: oceanic-oceanic, continental-continental – Convergent: oceanic-oceanic, continental-continental, oceanic-continental – Transform B) Skills • Draw and annotate a diagram showing the internal structure of the Earth • Identify and label major plates and the boundary types on maps • Draw labelled diagrams showing the different types of movements taking place at plate boundaries

Key Question 2: What landforms and associated tectonic phenomena are found at plate boundaries?

• Discuss how plate movements influence the general distribution of landforms and associated phenomena • Describe the landforms and phenomena associated with plate movements • Explain the causes of landforms and phenomena associated with plate movements • Describe the structure of volcanoes • Explain the characteristics of volcanoes • Explain the formation of volcanoes • Discuss the benefits and risks of living in volcanic areas • Discuss the impact of earthquakes on people living in areas prone to this natural hazard	A) Knowledge • Plate movements and associated landforms – Divergent: Rift valleys and block mountains – Convergent: Fold mountains – Divergent and Convergent: Volcanoes • Phenomena and their causes: earthquakes, tsunamis, volcanic eruptions • Structure of volcanoes: crater, caldera, vent, magma chamber • Characteristics and formation of volcanoes: shield volcano, stratovolcano, viscosity of lava • Benefits of living in volcanic areas: fertile soil, precious stones and minerals, tourism and geothermal energy • Risks of living in volcanic areas: massive destruction by volcanic materials, pollution • Risks associated with living in earthquake zones: disruption of services, landslides, destruction of properties and infrastructure, loss of lives, tsunami B) Skills • Analyse maps and photographs of major tectonic landforms and phenomena to derive the relationship between their distribution patterns and plate boundaries • Draw an annotated cross-section of a volcano • Draw labelled diagrams to show the formation of a fold mountain, a rift valley, a block mountain and a volcano
Key Question 3: How do people prepare for and respond to earthquakes?	
• Discuss the responses of people to earthquakes and tsunamis • Assess the effectiveness of strategies in mitigating and responding to the effects of earthquakes and tsunamis	A) Knowledge • People may respond to natural hazards in several ways: preparedness measures, short-term responses, long-term responses B) Skills • Examine before and after satellite images and aerial photographs of a place affected by an earthquake or tsunami to identify and analyse the changes that have occurred
Topic 2: Variable Weather and Changing Climate – A continuing challenge?	
Key Question 1: Why do different places experience different weather and climate?	
Learning Outcomes	**Content**
Students will be able to:	A) Knowledge • Definition of weather and climate

• Differentiate between weather and climate • Explain the daily and seasonal variations in temperature at a particular location • Compare and explain the variations in temperature between different locations • Explain the differences in relative humidity in different locations • Explain the formation of convectional rain and relief rain • Explain how coastal temperatures are moderated by land and sea breezes • Explain the formation of monsoon winds • Describe and explain the distribution and characteristics of equatorial, monsoon and cool temperate climates • Describe and explain the weather and climate of Singapore with reference to rainfall, relative humidity and temperature	• Elements of weather: temperature, relative humidity, clouds and rainfall, pressure and winds • Temperature – Factors influencing the temperature of locations: latitude, altitude, distance from the sea, cloud cover • Relative humidity, clouds and rainfall – Relative humidity – Formation of rain: convectional and relief rain • Pressure and winds – Pressure and movement of air – Wind systems: land and sea breezes, monsoon winds • Equatorial climate • Monsoon climate • Cool temperate climate (marine west-coast) B) Skills • Use of appropriate instruments to gather weather data (temperature, rainfall, air pressure, wind and relative humidity) • Make calculations of weather data (annual range, diurnal range, mean monthly, relative humidity) • Use appropriate graphs and diagrams to represent weather data
Key Question 2: What is happening to the Earth's climate?	
• Describe and explain climate change since 1880 • Explain the greenhouse effect • Discuss the natural causes of recent climate change • Explain how human activities lead to enhanced greenhouse effect • Discuss the impact of climate change • Describe the responses to climate change	A) Knowledge • Changes in climate – Global records since 1881 show a significant, but irregular temperature rise of 0.3°C to 0.6°C. – Global cooling was recorded after WWII for several decades because of industrial pollution and volcanic activity (global dimming). – Global warming over the last century: world is warming on average by 0.74°C, with most of that since 1970s – Global temperatures in the last decade reached the highest levels on record.

	• Greenhouse effect is a natural process by which greenhouse gases trap heat in the atmosphere • Natural causes of recent climatic change: variations in solar output, volcanic eruptions • Anthropogenic factors leading to enhanced greenhouse effect – Deforestation and associated increase in atmospheric carbon dioxide – Changing land use and associated increase in greenhouse gases • Impacts of climate change – Sea level rise – More frequent extreme weather events – Spread of some infectious insect-borne diseases – Lengthen the growing season in certain regions • Responses and challenges to climate change – International community (Kyoto Protocol) – Nations (Singapore) B) Skills • Extract information, describe trends and draw conclusions from graphs on temperature and greenhouse gases
Topic 3: Global Tourism – Is tourism the way to go?	
Key Question 1: How does the nature of tourism vary from place to place?	
Learning Outcomes	**Content**
Students will be able to: • Describe and give examples of different types of tourism • Explain why tourist activities are different at different places • Discuss the roles of different groups in promoting tourism	A) Knowledge • Tourists are people who travel and stay away from their normal place of residence for more than 24 hours • Tourism may be categorised according to types of attractions offered to tourists. Different places and environments provide different opportunities for tourist activities: places of scenic beauty, places with good facilities, places with rich culture, places of conflicts • Role of different groups in tourism: government, media and international organizations B) Skills • Classify key global tourist attractions by type • With reference to a map, describe distribution of key global tourist attractions by type • Identify key features of specific tourist sites and associated tourist activities

Key Question 2: Why has tourism become a global phenomenon?	
• Describe the trends of both domestic tourism and international tourism • Describe the changing nature of global tourism • Explain the growth of global tourism • Explain why tourism is subject to fluctuations	A) Knowledge • Trends in the global tourism industry in terms of destinations, country of origin and tourist dollars for: domestic tourism, international tourism • Evolution of mass tourism in the form of the package holiday to niche tourism • Development of short haul destinations and the growth of long-haul tourism • Reasons for the growth of global tourism – Developments in technology – Demand factors arising from changing profile of tourists – Destination factors • Impact of events that hinder the growth of tourism: disasters, recessions, political situations and diseases B) Skills • Extract information on trends in global tourist industry from graphs or tables • Extract information on factors affecting growth of the global tourist industry from maps, graphs or tables • Analyse tourist revenues using diagrams such as bar graph and pie chart • Analyse top tourist destinations and tourist origins for a selected country using flow maps and pie charts
Key Question 3: Developing tourism at what cost?	
• Assess the impact of tourism on a country • Explain how tourism can be made sustainable • Discuss the roles of various groups in taking care of the tourist areas	A) Knowledge • Impact of the growth of tourism on a country – Economic: advantages and disadvantages – Socio-cultural: advantages and disadvantages – Environmental: advantages and disadvantages • Managing the impact of tourism – Conserve fragile environments – Promote sustainable tourism through laws and regulation and support from local population

	– Responsibilities of various groups in conserving and protecting tourist areas: local communities, visitors, tour operators, planning authorities, non-governmental organisations B) Skills • Extract information from sources regarding tourism in a selected country • Design questionnaires
Topic 4: Food Resources – Is technology a panacea for food shortage?	
Key Question 1: How and why has food consumption patterns changed since 1960s?	
Learning Outcomes	**Content**
Students will be able to: • Describe variations in global food consumption patterns between DCs and LDCs over time • Describe the changing food preferences in DCs and LDCs • Explain why variations exist and persist in food consumption between DCs and LDCs	A) Knowledge • Variations in global food consumption patterns between DCs and LDCs over time, in terms of: indicators of food consumption, changing food preferences • Reasons for the growth and variations in food consumption: economic, socio-cultural, political • Impact of inadequate food consumption on individuals and countries: health, economic, political, social • Impact of excess food consumption on individuals and countries: health, economic, social B) Skills • Compare food consumption levels between DCs and LDCs shown in maps or graphs • Compare how food consumption patterns are influenced by changes in income
Key Question 2: What are the trends and challenges in production of food crops?	
• Describe and explain the trends in production of food crops since 1960s • Discuss the factors affecting the intensity of food production • Discuss the effects of intensification of food production activities on water and soil quality • Discuss the causes of food shortage	A) Knowledge • Trends in production of food crop[s like rice and wheat from 1960s: increased intensity of production of food crops • Factors affecting the intensity of food production: physical, economic, political, technological advances • Challenges associated with intensification of production of crops from 1960s: effects of use of irrigation and chemicals on water and soil quality • Causes of food shortage: physical, political, economic, social B) Skills • Identify areas on maps where major crops (rice and wheat) are grown

	• Describe how interaction between physical and human environments affects food production from maps and photographs • With reference to a given resource, describe the range of products produced by an agri-business and its spatial network

3.5 CONTENT FOR SYLLABUS 2120 GCE N(A)-LEVEL GEOGRAPHY ELECTIVE SYLLABUS	
Topic 1: Living With Tectonic Hazards – Risk or opportunity?	
Key Question 1: Why are some areas more prone to tectonic hazards?	
Learning Outcomes	**Content**
Students will be able to: • Outline the main types of natural hazards • Describe the internal structure of the Earth • Explain the movement of plates • Describe the global distribution of tectonic plates and types of plate boundaries	A) Knowledge • Definition of natural hazards and the main ways they may be classified: climate-related, tectonic hazards • Internal structure of the Earth – Layered structure: core, mantle, continental crust and oceanic crust – Characteristics of each layer: thickness, solid or liquid state • Movement of crustal plates driven by the pull of subducting plates and convection currents circulating within the mantle • Names, types and locations of major plates and plate boundaries in the world • Types of plate boundaries and examples: – Divergent: oceanic-oceanic, continental-continental – Convergent: oceanic-oceanic, continental-continental, oceanic-continental – Transform B) Skills • Draw and annotate a diagram showing the internal structure of the Earth • Identify and label major plates and the boundary types on maps • Draw labelled diagrams showing the different types of movements taking place at plate boundaries
Key Question 2: What landforms and associated tectonic phenomena are found at plate boundaries?	
• Discuss how plate movements influence the general distribution of landforms and associated phenomena	A) Knowledge • Plate movements and associated landforms – Divergent: Rift valleys and block mountains

• Describe the landforms and phenomena associated with plate movements • Explain the causes of landforms and phenomena associated with plate movements • Describe the structure of volcanoes • Explain the characteristics of volcanoes • Explain the formation of volcanoes • Discuss the benefits and risks of living in volcanic areas • Discuss the impact of earthquakes on people living in areas prone to this natural hazard	– Convergent: Fold mountains – Divergent and Convergent: Volcanoes • Phenomena and their causes: earthquakes, tsunamis, volcanic eruptions • Structure of volcanoes: crater, caldera, vent, magma chamber • Characteristics and formation of volcanoes: shield volcano, stratovolcano, viscosity of lava • Benefits of living in volcanic areas: fertile soil, precious stones and minerals, tourism and geothermal energy • Risks of living in volcanic areas: massive destruction by volcanic materials, pollution • Risks associated with living in earthquake zones: disruption of services, landslides, destruction of properties and infrastructure, loss of lives, tsunami B) Skills • Analyse maps and photographs of major tectonic landforms and phenomena to derive the relationship between their distribution patterns and plate boundaries • Draw an annotated cross-section of a volcano • Draw labelled diagrams to show the formation of a fold mountain, a rift valley, a block mountain and a volcano
Topic 2: Variable Weather and Changing Climate – A continuing challenge?	
Key Question 1: Why do different places experience different weather and climate?	
Learning Outcomes	**Content**
Students will be able to: • Differentiate between weather and climate • Explain the daily and seasonal variations in temperature at a particular location • Compare and explain the variations in temperature between different locations • Explain the differences in relative humidity in different locations • Explain the formation of convectional rain and relief rain	A) Knowledge • Definition of weather and climate • Elements of weather: temperature, relative humidity, clouds and rainfall, pressure and winds • Temperature – Factors influencing the temperature of locations: latitude, altitude, distance from the sea, cloud cover • Relative humidity, clouds and rainfall – Relative humidity – Formation of rain: convectional and relief rain • Pressure and winds – Pressure and movement of air

• Explain how coastal temperatures are moderated by land and sea breezes • Explain the formation of monsoon winds • Describe and explain the distribution and characteristics of equatorial, monsoon and cool temperate climates • Describe and explain the weather and climate of Singapore with reference to rainfall, relative humidity and temperature	– Wind systems: land and sea breezes, monsoon winds • Equatorial climate • Monsoon climate • Cool temperate climate (marine west-coast) B) Skills • Use of appropriate instruments to gather weather data (temperature, rainfall, air pressure, wind and relative humidity) • Make calculations of weather data (annual range, diurnal range, mean monthly, relative humidity) • Use appropriate graphs and diagrams to represent weather data
Key Question 2: What is happening to the Earth's climate?	
• Describe and explain climate change since 1880 • Explain the greenhouse effect • Discuss the natural causes of recent climate change • Explain how human activities lead to enhanced greenhouse effect • Discuss the impact of climate change • Describe the responses to climate change	A) Knowledge • Changes in climate – Global records since 1881 show a significant, but irregular temperature rise of 0.3°C to 0.6°C. – Global cooling was recorded after WWII for several decades because of industrial pollution and volcanic activity (global dimming). – Global warming over the last century: world is warming on average by 0.74°C, with most of that since 1970s – Global temperatures in the last decade reached the highest levels on record. • Greenhouse effect is a natural process by which greenhouse gases trap heat in the atmosphere • Natural causes of recent climatic change: variations in solar output, volcanic eruptions • Anthropogenic factors leading to enhanced greenhouse effect – Deforestation and associated increase in atmospheric carbon dioxide – Changing land use and associated increase in greenhouse gases • Impacts of climate change – Sea level rise – More frequent extreme weather events – Spread of some infectious insect-borne diseases – Lengthen the growing season in certain regions

	• Responses and challenges to climate change – International community (Kyoto Protocol) – Nations (Singapore) B) Skills • Extract information, describe trends and draw conclusions from graphs on temperature and greenhouse gases
Topic 3: Global Tourism – Is tourism the way to go?	
Key Question 1: How does the nature of tourism vary from place to place?	
Learning Outcomes	**Content**
Students will be able to: • Describe and give examples of different types of tourism • Explain why tourist activities are different at different places • Discuss the roles of different groups in promoting tourism	A) Knowledge • Tourists are people who travel and stay away from their normal place of residence for more than 24 hours • Tourism may be categorised according to types of attractions offered to tourists. Different places and environments provide different opportunities for tourist activities: places of scenic beauty, places with good facilities, places with rich culture, places of conflicts • Role of different groups in tourism: government, media and international organizations B) Skills • Classify key global tourist attractions by type • With reference to a map, describe distribution of key global tourist attractions by type • Identify key features of specific tourist sites and associated tourist activities
Key Question 2: Why has tourism become a global phenomenon?	
• Describe the trends of both domestic tourism and international tourism • Describe the changing nature of global tourism • Explain the growth of global tourism • Explain why tourism is subject to fluctuations	A) Knowledge • Trends in the global tourism industry in terms of destinations, country of origin and tourist dollars for: domestic tourism, international tourism • Evolution of mass tourism in the form of the package holiday to niche tourism • Development of short haul destinations and the growth of long-haul tourism • Reasons for the growth of global tourism – Developments in technology – Demand factors arising from changing profile of tourists – Destination factors

	• Impact of events that hinder the growth of tourism: disasters, recessions, political situations and diseases B) Skills • Extract information on trends in global tourist industry from graphs or tables • Extract information on factors affecting growth of the global tourist industry from maps, graphs or tables • Analyse tourist revenues using diagrams such as bar graph and pie chart • Analyse top tourist destinations and tourist origins for a selected country using flow maps and pie charts
Key Question 3: Developing tourism at what cost?	
• Assess the impact of tourism on a country • Explain how tourism can be made sustainable • Discuss the roles of various groups in taking care of the tourist areas	A) Knowledge • Impact of the growth of tourism on a country – Economic: advantages and disadvantages – Socio-cultural: advantages and disadvantages – Environmental: advantages and disadvantages • Managing the impact of tourism – Conserve fragile environments – Promote sustainable tourism through laws and regulation and support from local population – Responsibilities of various groups in conserving and protecting tourist areas: local communities, visitors, tour operators, planning authorities, non-governmental organisations B) Skills • Extract information from sources regarding tourism in a selected country • Design questionnaires

3.6 GEOGRAPHICAL INVESTIGATIONS

In the Geography and Geography Elective syllabuses, geographical investigation (GI, for short) is a vital and core component in a meaningful geographical inquiry process where students are presented with opportunities to investigate geographical phenomena in authentic contexts.

Physical geographers almost always use the scientific process involving the formulation and testing of hypotheses. While some human geographers use similar approaches, others may employ more qualitative approaches such as interviews and non-participant observation. In the Geography and Geography Elective syllabuses, students would have the chance to draw on the approaches of both physical and human geography by employing different data collection methods suited to the nature of their investigations.

GI provides students with opportunities to:

- carry out a more student-directed geographical inquiry, and participate in fieldwork, as students are required to go beyond the classroom to actively look for and gather data to address the inquiry;
- apply and transfer what they have learnt from their geography lessons to a real world context;
- be assessed more holistically in terms of a wider range of geographical skills; and
- develop the skills and attitudes to work individually and collaboratively in groups as students are required to complete both individual and group components.

In the Geography and Geography Elective syllabuses, students undertake one GI a year.

Figure 7: Geographical Investigations in Geography and Geography Elective Syllabuses

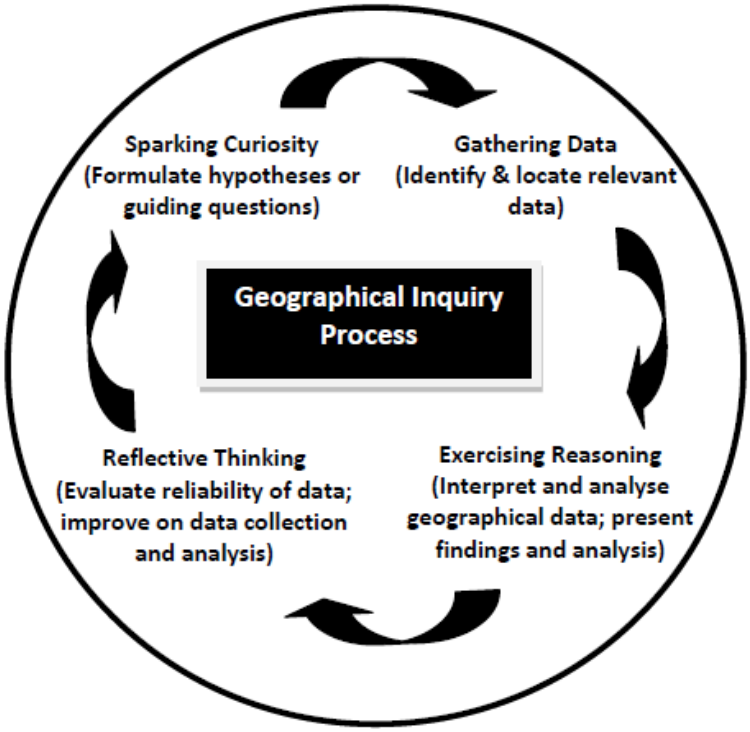
Topics	O-Level Geography	N(A)-Level Geography	O-Level Geography Elective	N(A)-Level Geography Elective
Coasts	✔	✔		
Variable Weather & Changing Climate			✔	✔
Global Tourism	✔	✔	✔	✔

The inquiry process is mirrored in the course of undertaking a geographical investigation (see Figure 8). This process would involve students identifying a geographical issue or problem as a result of their studies or observations; they formulate a hypothesis or guiding question and work out ways to collect and record the required data. Next, students 'exercise reasoning' by analysing the data and selecting appropriate methods to represent their findings. They then draw conclusions that result in the acceptance or rejection of the original hypothesis or answer their question. Finally, students would carry out 'reflective thinking' in order to

consolidate what they have (and what they have not) learned from their investigation. They also identify the limitations of their study and suggest possible ways to improve it.

It is possible for the entire process to be carried out by students working in groups or to split certain tasks in the process into parts that are done cooperatively and parts that are done individually, thereby facilitating the development of collaborative skills.

Figure 8: Geographical Inquiry Process in Geographical Investigations



4. ASSESSMENT

4.1 PURPOSE OF ASSESSMENT

The Geography and Geography Elective syllabuses prepare students towards the O and N(A)-Level examinations which certify end-of-course performance and for placement purposes. However, it is not an end in itself. The assessment in Geography is aligned to the MOE Assessment Philosophy which comprises three key messages:

- Assessment is integral to the learning process.
- Assessment begins with clarity of purpose.
- Assessment should gather information to inform future practices.

As such, assessment in Geography will comprise both Assessment for Learning and Assessment of Learning. In the former, assessment activities are designed to provide information to be used as feedback to modify practices by teachers and input to help students improve on their learning. In the latter, assessment activities are designed to provide judgement about students' attainment of the intended learning outcomes in the syllabuses.

4.2 ASSESSMENT OBJECTIVES (AO)

In the Geography and Geography Elective syllabuses, the geographical knowledge and skills to be assessed are defined in the Assessment Objectives (AOs). These AOs are shown below.

AO1: Knowledge
Students should be able to:

- demonstrate relevant factual knowledge – geographical facts, concepts, processes, interactions and trends; and
- demonstrate knowledge of relevant fieldwork techniques – identification of geographical question, sequence of fieldwork enquiry, primary and secondary data collection methods.

AO2: Critical Understanding and Constructing Explanation
Students should be able to:

- select, organise and apply concepts, terms and facts learnt;
- make judgements, recommendations and decisions; and
- evaluate data collection methods and suggest improvements.

AO3: Interpreting and Evaluating Geographical Data
Students should be able to:

- comprehend and extract relevant information from geographical data (numerical, diagrammatic, pictorial and graphical forms);
- use and apply geographical knowledge and understanding to interpret geographical data:
    - recognise patterns in geographical data and deduce relationships;
    - compare and contrast different views;

    - present geographical data in an appropriate form and an effective manner;
    - draw conclusions based on a reasoned consideration of evidence; and
- evaluate the validity and limitations of fieldwork evidence and of the conclusions reached.

4.3 SCHEME OF ASSESSMENT FOR O AND N(A)-LEVEL GEOGRAPHY SYLLABUSES

Assessment Specification Grid

The table below shows the approximate weighting of the Assessment Objectives in the syllabuses.

Assessment Objectives	Weighting
Paper 1	
AO1+2	25%
AO1+3	25%
Total for Paper 1	**50%**
Paper 2	
AO1+2	25%
AO1+3	25%
Total for Paper 2	**50%**
Total for Papers 1 and 2	**100%**

O-Level Geography Syllabuses

The examination consists of **two** papers – Paper 1 and Paper 2, taken at separate sittings. The duration of Paper 1 is **1 hour 40 minutes** and Paper 2 is **1 hour 30 minutes**. Candidates will answer a total of four questions and each question carries equal weighting (25% each).

The question in Section A of Paper 1 consists of **no more than 10 parts**, including sub-division of parts. Each question in Section B of Paper 1 and in Paper 2 consists of **no more than five parts**, including sub-division of parts. This includes an open-ended question, which will be marked according to level descriptors and capped at a maximum of 8 marks. Each open-ended question will be marked based on 3 levels. The question in Section A of Paper 1 and the remaining part-questions in Section B of Paper 1 and in Paper 2 will be marked using point marking.

N(A)-Level Geography Syllabuses

The examination consists of **two** papers – Paper 1 and Paper 2, taken at separate sittings. The duration of Paper 1 is **1 hour 40 minutes** while the duration of Paper 2 is **1 hour 30 minutes**. Candidates will answer a total of two questions in each paper and each question carries equal weighting (25% each).

The question in Section A of Paper 1 consists of **no more than 11 parts**, including sub-division of parts. Each question in Section B of Paper 1 and in Paper 2 consists of **no more than six parts**, including sub-division of parts. This includes an open-ended question which will be marked according to level descriptors and capped at a maximum of 6 marks. Each open-ended

question will be marked based on 3 levels. The question in Section A of Paper 1 and the remaining part-questions in Section B of Paper 1 and in Paper 2 will be marked using point marking.

4.4 SCHEME OF ASSESSMENT FOR O AND N(A)-LEVEL GEOGRAPHY ELECTIVE SYLLABUSES

Assessment Specification Grid
The table below shows the approximate weighting of the Assessment Objectives in the syllabuses.

Assessment Objectives	Weighting
AO1+2	25%
AO1+3	25%
Total	**50%**

O-Level Geography Elective Syllabuses
The examination consists of **one** paper. The paper comprises three sections – Sections A and B *(Global Tourism and Variable Weather and Climate)* and Section C *(Living with Tectonic Hazards and Food Resources)*. The duration of the paper **is 1 hour 40 minutes**.

For Section A, the question consists of **no more than five parts**, including the sub-division of parts. For Section B, the question consists of **no more than three parts**, including sub-division of parts. For Section C, the question consists of **no more than five parts**, including sub-division of parts.

The last part-question in both Sections B and C includes an open-ended question which will be marked according to level descriptors and capped at a maximum of 8 marks. Each open-ended question will be marked based on 3 levels. The question in Section A and the remaining part-questions in Sections B and C will be marked using point marking.

N(A)-Level Geography Elective Syllabuses
The examination consists of **one** paper. The paper comprises three sections – Section A *(Global Tourism and Weather and Climate)*, Section B *(Global Tourism)* and Section C *(Living with Tectonic Hazards and Weather and Climate)*. The duration of the paper is **1 hour 40 minutes**.

For Section A, the question consists of **no more than six parts**, including the sub-division of parts. For Section B, the question consists of **no more than three parts**, including sub-division of parts. For Section C, the question consists of **no more than six parts**, including sub-division of parts. The last part-question in both Sections B and C includes an open-ended question which will be marked according to level descriptors and capped at a maximum of 6 marks. Each open-ended question will be marked based on 3 levels. The question in Section A and the remaining part-questions in Sections B and C will be marked using point marking.