

# **Geography**

## **Singapore-Cambridge General Certificate of Education Normal (Academic) Level (2020) (Syllabus 2246)**

- Common Last Topics (CLT) highlighted in yellow on pages 10 and 25 will not be examined in 2020.
- Questions assessing CLT will be removed from all papers and candidates will be informed at the start of the examination.
- For Geography 2246, the removal of CLT will result in candidates having no question option in Paper 2. Please see details on page 8.
- The durations of all papers remain unchanged.
- We would like to assure candidates that a lack of options in Paper 2 will be taken into account during grading to ensure fair assessment.

# Geography

## Singapore-Cambridge General Certificate of Education Normal (Academic) Level (2020) (Syllabus 2246)

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## INTRODUCTION

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### Desired Outcomes of Education and the Study of Geography

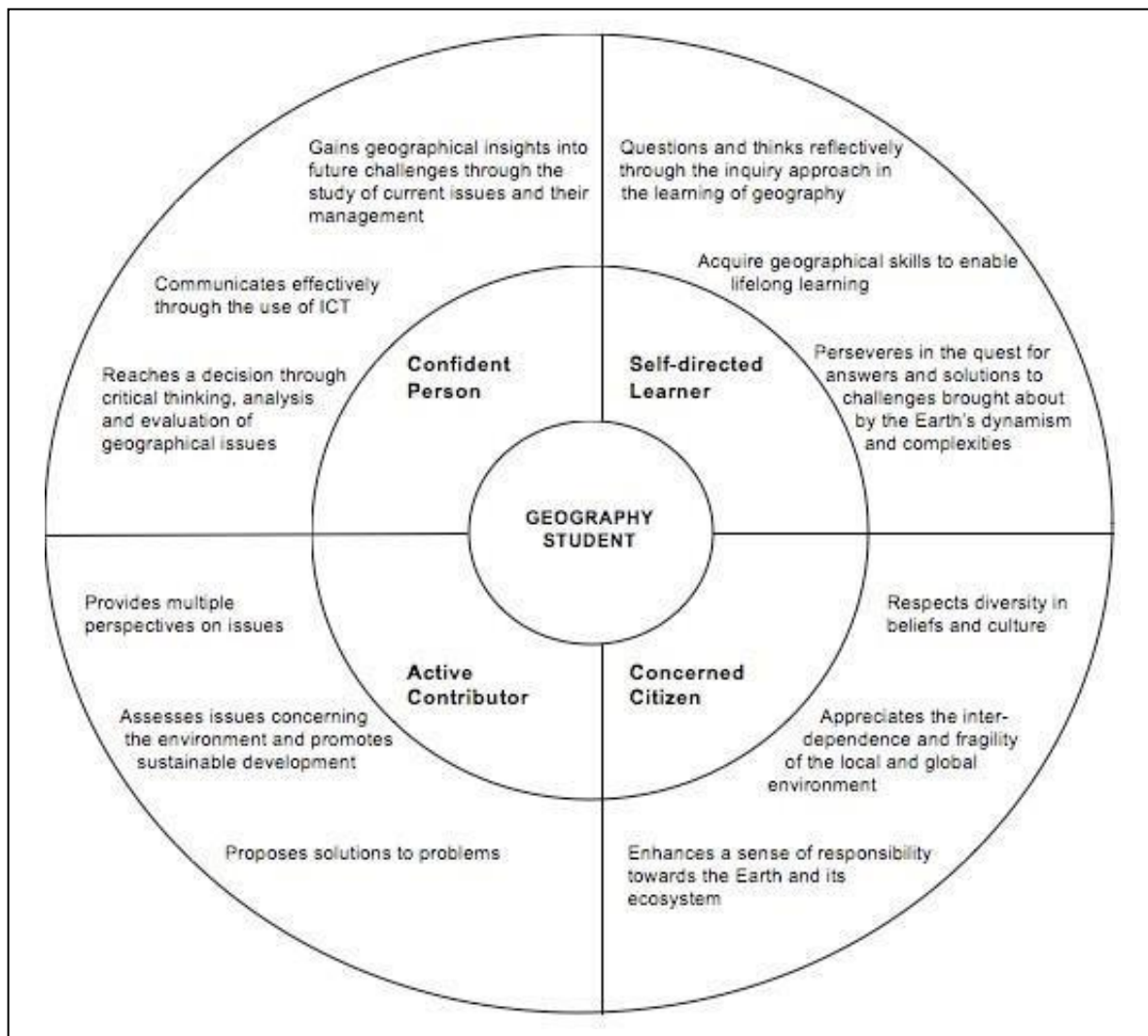
The Desired Outcomes of Education (DOE) are attributes that educators aspire to for our learners. These outcomes establish a common purpose for Geography teachers, and serve as a compass to steer the teaching and learning process.

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 takes responsibility for his own learning, who questions, reflects, perseveres in the pursuit of learning
- an *active contributor* who is able to work effectively in teams, exercises initiative, takes calculated risks, is innovative and strives for excellence
- a *concerned citizen* who is rooted to Singapore, has a strong civic consciousness, is informed, and takes an active role in bettering the lives of others around him.

As a subject, Geography builds on students' experiences and prior knowledge to examine the physical and human phenomena found on Earth as well as their complex interactions and patterns across space.

Geography emphasises the integrative study of physical and human environments to enable students to gain better understanding of their own space and other parts of the world. It also focuses on the interconnectedness among groups of people, and between people and their environment. The Geography student can expect 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 are prepared for their roles as informed citizens in the 21st century. Geography also imbues 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 them in good stead to attain the DOE. Details of how the study of Geography contributes towards the DOE of the Singapore education system are shown in Fig. 1.



**Fig. 1: Desired Outcomes of Singapore's Education through Geography**

## **KEY GEOGRAPHICAL CONCEPTS**

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There are six key concepts that underpin the study of Geography. Students need to understand these concepts in order to deepen and broaden their knowledge, understanding and skills of the subject. The key concepts and elaborations are as listed in the table below.

<b>1</b>	<b>Space</b>
	<ul style="list-style-type: none"> <li>• Know the location and distribution of physical features and human activities.</li> <li>• Appreciate how and why the physical features and human activities are changing and their implications.</li> <li>• Understand the interactions between places and the patterns of networks created by movements within these places.</li> </ul>
<b>2</b>	<b>Place</b>
	<ul style="list-style-type: none"> <li>• Understand that every place has a unique set of physical and human characteristics.</li> <li>• Understand the dynamic nature of places, and the opportunities and challenges associated with them.</li> </ul>
<b>3</b>	<b>Scale</b>
	<ul style="list-style-type: none"> <li>• Appreciate different scales, from local to national and international.</li> <li>• Make links between scales to develop geographical understanding of issues confronting different societies.</li> </ul>
<b>4</b>	<b>Physical and human processes</b>
	<ul style="list-style-type: none"> <li>• Understand the complexity of physical processes and recognise the opportunities and challenges associated with these processes.</li> <li>• Understand how sequences of events and activities in the physical and human worlds are part of our dynamic planet and changing world.</li> </ul>
<b>5</b>	<b>Environmental and cultural diversity</b>
	<ul style="list-style-type: none"> <li>• Appreciate the differences and similarities between people, places, environments and cultures.</li> <li>• Appreciate the variety of people, places, environments and cultures in our varied and changing world.</li> </ul>
<b>6</b>	<b>Interdependence</b>
	<ul style="list-style-type: none"> <li>• Explore the socio-cultural, economic and environmental connections between places and earth's four spheres.</li> <li>• Understand the inter-relationships and interconnections when studying change in physical features and human activities at all scales.</li> </ul>

## **AIMS AND LEARNING OUTCOMES**

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### **AIMS**

The syllabus aims to enable candidates 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
- make informed judgements and sound decisions through the analysis, synthesis and evaluation of geographical information.

### **LEARNING OUTCOMES**

#### **Knowledge**

The syllabus intends that candidates develop knowledge with regard to:

- 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
- different approaches through which challenges faced can be managed by local, regional and global communities.

#### **Skills**

The syllabus intends for candidates 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
- analyse, evaluate and synthesise geographical data to make informed and sound decisions.

## Values

Through their geographical training, candidates 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
- respect and sensitivity towards the attitudes, values and beliefs of people in different human environments.

## **ASSESSMENT OBJECTIVES**

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Candidates should be able to:

### **AO1: Knowledge**

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

### **AO2: Critical Understanding and Constructing Explanation**

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

### **AO3: Interpreting and Evaluating Geographical Data**

- 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 in an effective manner
  - draw conclusions based on a reasoned consideration of evidence
- evaluate the validity and limitations of fieldwork evidence and of the conclusions reached

**Assessment Specification Grid**

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

<b>Assessment Objectives</b>	<b>Weighting</b>
<b>Paper 1</b>	
AO1+2	25%
AO1+3	25%
<b>Total for Paper 1</b>	<b>50%</b>
<b>Paper 2</b>	
AO1+2	25%
AO1+3	25%
<b>Total for Paper 2</b>	<b>50%</b>
<b>Total for Papers 1 and 2</b>	<b>100%</b>

**Note:** AO1 forms part of the testing of AO2 and AO3.



## SCHEME OF ASSESSMENT

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 **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.

<p><b>Paper 1</b></p> <p><b>50%</b></p> <p><b>50 marks</b></p> <p><b>1 hour 40 minutes</b></p>	<p><u>Section A (25%)</u></p> <p>One structured question on <b>Geographical Investigations</b> will be set based on the following topics:</p> <ul style="list-style-type: none"> <li>• Coasts</li> <li>• Global Tourism</li> </ul> <p>The question will be set on a specific topic or combination of topics. The question carries 25 marks. <b>Candidates must answer the question in this section.</b> They are advised to spend 55 minutes on the question.</p> <hr/> <p><u>Section B (25%)</u></p> <p>Two structured questions will be set based on the following topics:</p> <ul style="list-style-type: none"> <li>• Coasts</li> <li>• Global Tourism</li> </ul> <p>One question will be set on a specific topic. One other question will be set on a combination of topics. Each question carries 25 marks. <b>Candidates must answer one question from this section.</b> They are advised to spend 45 minutes on the question.</p>
<p><b>Paper 2</b></p> <p><b>50%</b></p> <p><b>50 marks</b></p> <p><b>1 hour 30 minutes</b></p>	<p>Three structured questions will be set based on the following topics:</p> <ul style="list-style-type: none"> <li>• Living with Tectonic Hazards</li> <li>• Food Resources</li> </ul> <p>Two questions will be set on specific topics. One other question will be set on a combination of topics. Each question carries 25 marks. <b>Candidates must answer two questions from this paper.</b> They are advised to spend 45 minutes on each question. This paper carries 50 marks.</p>
<p><b>Note:</b> Stimulus materials will be used where they facilitate the application of content to new contexts and issues. A non-exhaustive list of stimulus materials includes topographic and other maps, photographs, diagrams, sketches and texts. Map reading and skills of photograph interpretation, construction/completion of data presentation, interpretation of data (primary and secondary), and simple descriptive analysis of statistical data may be examined in both Papers 1 and 2. For map reading, this may only be tested in context as a sub-part of a question. It will not be set as a full 25 mark question. Candidates may be assessed in the application of geographical knowledge in decision-making processes. <b>Geographical investigations in the form of a fieldwork case study will only be examined in Section A of Paper 1.</b></p>	

Questions assessing CLT as highlighted on pages 10 and 25 will be removed from Paper 2. Candidates will answer all remaining questions in Paper 2 without any option.

## **USE OF CALCULATORS**

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An approved calculator may be used in all papers.

## **SYLLABUS FRAMEWORK AND OUTLINE**

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The N(A)-Level Geography syllabus is structured around three major themes, namely 'Our Dynamic Planet', 'Our Changing World' and 'Geographical Skills and Investigations'. Each physical and human geography theme comprises two topics as shown below:

### Theme 1: Our Dynamic Planet (Physical Geography)

- (1) Coasts – Should coastal environments matter?
- (2) Living with Tectonic Hazards – Risk or opportunity?

### 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?

### Theme 3: Geographical Skills and Investigations

- (5) Topographical Map Reading Skills
- (6) Geographical Data and Techniques
- (7) Geographical Investigations

The syllabus adopts an inquiry-based approach to the learning of Geography. It provides coverage of physical and human aspects of the subject and the linkages that exist between them by presenting them in the form of geographical questions. It gives students a deeper and critical understanding of the changing world and helps prepare them for the complexities in the 21st century.

There are four topics in themes 1 and 2 of the syllabus. The heading for each of these topics is presented in the form of an overarching geographical question. Each topic is organised around three key questions and these key questions serve as the organisational framework of the syllabus. For each key question, there are learning outcomes, content and main terms. The syllabus is designed such that the first two key questions guide students to gain an understanding and appreciation of the topic as stated in the overview. The knowledge and skills acquired would subsequently be used by students to apply to the issue studied when they proceed to the third key question (see Table 1 for the syllabus content outline and key questions).

In the syllabus, examples stated in brackets (xx) are meant to be exhaustive and compulsory and only these would be assessed in the examinations. In contrast, examples listed as (e.g. yyy) are not exhaustive and may be replaced with more recent and relevant ones given the indication of scale. Case studies where applicable, are to be studied in greater detail.

**Table 1: Syllabus Content Outline and Key Questions**

<b>Theme 1: Our Dynamic Planet (Physical Geography)</b>
<b>Topic 1: Coasts – Should coastal environments matter?</b>
<ul style="list-style-type: none"> <li>• How and why are coastal environments different and dynamic?</li> <li>• Why are coastal areas valuable? (Focus is on tropical coasts)</li> <li>• How can we manage coastal areas in a sustainable manner?</li> </ul>
<b>Topic 2: Living with Tectonic Hazards – Risk or opportunity?</b>
<ul style="list-style-type: none"> <li>• Why are some areas more prone to tectonic hazards?</li> <li>• What landforms and associated tectonic phenomena are found at plate boundaries?</li> <li>• How do people prepare and respond to earthquakes?</li> </ul>
<b>Theme 2: Our Changing World (Human Geography)</b>
<b>Topic 3: Global Tourism – Is tourism the way to go?</b>
<ul style="list-style-type: none"> <li>• How does the nature of tourism vary from place to place?</li> <li>• Why has tourism become a global phenomenon?</li> <li>• Developing tourism at what cost?</li> </ul>
<b>Topic 4: Food Resources – Is technology a panacea for food shortage?</b>
<ul style="list-style-type: none"> <li>• How and why has food consumption patterns changed since 1960s?</li> <li>• What are the trends and challenges in production of food crops?</li> <li>• How can the problem of food shortage be addressed?</li> </ul>
<b>Theme 3: Geographical Skills and Investigations</b>
<b>Topic 5: Topographical Map Reading Skills</b>
<b>Topic 6: Geographical Data and Techniques</b>
<b>Topic 7: Geographical Investigations</b>

## SYLLABUS CONTENT

### Theme 1: Our Dynamic Planet (Physical Geography)

#### Topic 1: Coasts – Should coastal environments matter?

One third of the world's population live in coastal areas, approximately 4% of Earth's total land area. The study of coastal environments is especially crucial at a time when there is greater threat to coastal areas due to the rise in sea levels. Through the study of physical processes occurring in coastal areas and the resulting landform features, students will understand how dynamic and fragile coastal environments are. They will examine why coastal environments are highly valuable in supporting a variety of human activities. They will also study the challenges involved in making decisions pertaining to the management of issues that arise from increasing human interferences in coastal environments.

Learning Outcomes	Content	Main Terms
<b>Key Question 1: How and why are coastal environments different and dynamic?</b>		
Students will be able to: <ul style="list-style-type: none"> <li>Explain the dynamic nature of coastal environments</li> </ul>	A) <u>Knowledge</u> <ul style="list-style-type: none"> <li>Definition of coast – the area where the land meets the sea</li> <li>Coastal environments are dynamic and changing due to               <ul style="list-style-type: none"> <li>Waves</li> <li>Currents</li> <li>Tides</li> <li>Geology</li> <li>Human activities</li> <li>Ecosystem type: mangrove and coral</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Coast</li> <li>Dynamic coastal environment</li> <li>Waves</li> <li>Tide</li> <li>Currents</li> <li>Geology</li> <li>Ecosystem</li> </ul>
<ul style="list-style-type: none"> <li>Explain how waves are generated and the factors influencing wave energy</li> <li>Explain wave refraction and the processes which occur when waves break</li> <li>Describe the different types of waves and their associated coastal environments</li> </ul>	<ul style="list-style-type: none"> <li>Waves are generated when there is a transfer of energy from wind to water surface</li> <li>Wave energy depends on the following factors               <ul style="list-style-type: none"> <li>Fetch</li> <li>Wind speed</li> <li>Wind duration</li> </ul> </li> <li>Wave refraction and associated concentration and dissipation of wave energy</li> <li>Processes which occur when waves break               <ul style="list-style-type: none"> <li>Swash</li> <li>Backwash</li> </ul> </li> <li>Types of waves and wave environments               <ul style="list-style-type: none"> <li>Constructive waves occur in an environment with low gradient and low energy</li> <li>Destructive waves occur in an environment with steep gradient and high energy</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Fetch</li> <li>Wave refraction</li> <li>Swash</li> <li>Backwash</li> <li>Constructive wave</li> <li>Destructive wave</li> </ul>

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Learning Outcomes	Content	Main Terms
<ul style="list-style-type: none"> <li>• Explain the different coastal processes</li> <li>• Describe and explain the formation of cliffs, headlands, caves, arches, stacks and shore platforms</li> <li>• Describe and explain the formation of bays, beaches, spits and tombolos</li> </ul>	<ul style="list-style-type: none"> <li>• Coastal processes                             <ul style="list-style-type: none"> <li>– Erosion by waves                                     <ul style="list-style-type: none"> <li>○ Abrasion</li> <li>○ Hydraulic action</li> <li>○ Attrition</li> <li>○ Solution</li> </ul> </li> <li>– Transportation through longshore drift</li> <li>– Deposition</li> </ul> </li> <li>• Formation of coastal landforms                             <ul style="list-style-type: none"> <li>– Erosional landforms                                     <ul style="list-style-type: none"> <li>○ Cliffs and shore platforms</li> <li>○ Headlands and bays</li> <li>○ Caves, arches and stacks</li> </ul> </li> <li>– Depositional landforms                                     <ul style="list-style-type: none"> <li>○ Beaches</li> <li>○ Spits and tombolos</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Abrasion</li> <li>• Hydraulic action</li> <li>• Attrition</li> <li>• Solution</li> <li>• Longshore drift</li> <li>• Longshore current</li> <li>• Headland</li> <li>• Cliff</li> <li>• Caves</li> <li>• Arches</li> <li>• Stacks</li> <li>• Shore platform</li> <li>• Bay</li> <li>• Beach</li> <li>• Spit</li> <li>• Tombolo</li> </ul>
	<p>B) <u>Skills</u></p> <ul style="list-style-type: none"> <li>• Identify coastal landforms and features shown in topographical maps, photographs and sketches</li> <li>• Draw and label a field sketch of a coastal area shown in a photograph</li> <li>• Investigate how wave type influences beach profile and how longshore drift forms characteristic landforms</li> <li>• Measure beach slope, beach materials, wave frequency and beach profile</li> <li>• Analyse data and derive relationships between the following variables                             <ul style="list-style-type: none"> <li>– Wave steepness and beach slope</li> <li>– Grain size and beach slope</li> </ul> </li> <li>• Calculate wave steepness using wave height and wave length data</li> <li>• Plot and label beach profile</li> </ul>	

Learning Outcomes	Content	Main Terms
<b>Key Question 2: Why are coastal areas valuable?</b> (*Focus is on tropical coasts)		
Students will be able to: <ul style="list-style-type: none"> <li>• Explain how the distinctive characteristics of coastal areas support a variety of human activities</li> </ul>	<ul style="list-style-type: none"> <li>• Human activities in coastal areas with reference to an example for each of the following:               <ul style="list-style-type: none"> <li>– Fisheries and aquaculture (e.g. Kung Krabaen Bay in eastern Thailand)</li> <li>– Housing and transportation (e.g. houses built on stilts and ferry services to Kukup in southern Johor in Malaysia)</li> <li>– Tourism and recreation (e.g. marinas and integrated resort on Sentosa in Singapore)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Fisheries</li> <li>• Aquaculture</li> <li>• Housing</li> <li>• Transportation</li> <li>• Tourism</li> <li>• Recreation</li> </ul>
<ul style="list-style-type: none"> <li>• Describe the global distribution and characteristics of coral reef ecosystem</li> <li>• Explain the value of coral reef ecosystem in the coastal environment</li> <li>• Discuss the pressures that threaten the coral reef ecosystem</li> </ul>	<ul style="list-style-type: none"> <li>• Coral reefs:               <ul style="list-style-type: none"> <li>– Environmental conditions for growth                   <ul style="list-style-type: none"> <li>○ Sea surface temperature</li> <li>○ Amount of sunlight received, dependent on turbidity and water depth</li> <li>○ Level of salinity and oxygen content</li> </ul> </li> <li>– Distribution in the Tropics (e.g. Great Barrier Reef in Australia, reefs around Philippines and Indonesia)</li> <li>– Value                   <ul style="list-style-type: none"> <li>○ Coastal protection</li> <li>○ Habitat for marine creatures</li> </ul> </li> <li>– Pressures                   <ul style="list-style-type: none"> <li>○ Over-collection of corals</li> <li>○ Fishing methods</li> <li>○ Recreational use of the coast</li> <li>○ Coastal development</li> <li>○ Climate change causing coral bleaching</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Coral reefs</li> <li>• Turbidity</li> <li>• Value</li> <li>• Habitat</li> <li>• Coral bleaching</li> <li>• Pressures</li> <li>• Coastal development</li> </ul>
<ul style="list-style-type: none"> <li>• Describe the global distribution and characteristics of mangrove ecosystem</li> <li>• Explain the value of the mangrove ecosystem in the coastal environment</li> <li>• Discuss the pressures that threaten the mangrove ecosystem</li> </ul>	<ul style="list-style-type: none"> <li>• Mangroves               <ul style="list-style-type: none"> <li>– Environmental conditions for growth                   <ul style="list-style-type: none"> <li>○ Sediment supply</li> <li>○ Sheltered coastline resulting in low energy wave environment</li> </ul> </li> <li>– Distribution in the Tropics (e.g. the Sundarbans in India and Bangladesh)</li> <li>– Adaptations</li> <li>– Value                   <ul style="list-style-type: none"> <li>○ Habitat for marine creatures</li> <li>○ Stabilise shorelines by trapping sediments</li> <li>○ Protect coastal areas by absorbing force of storms</li> </ul> </li> <li>– Pressures                   <ul style="list-style-type: none"> <li>○ Clearing of mangroves for fuel wood and charcoal</li> <li>○ Conversion to other land uses (e.g. paddy fields, shrimp farms)</li> <li>○ Coastal development</li> <li>○ Rising sea level</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Mangrove species</li> <li>• Value</li> <li>• Adaptation</li> <li>• Pressures</li> <li>• Rising sea level</li> </ul>

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Learning Outcomes	Content	Main Terms
	<p>B) <u>Skills</u></p> <ul style="list-style-type: none"> <li>• Locate major coral reef and mangrove areas on the world map</li> <li>• Identify the characteristics of mangroves shown in photographs and sketches that help them to adapt to the coastal environment</li> <li>• Identify the different kinds of human activities in coastal areas shown in maps, photographs and sketches</li> </ul>	
<b>Key Question 3: How can we manage coastal areas in a sustainable manner?</b>		
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Explain how coastal areas can be managed in a sustainable manner</li> <li>• Evaluate the effectiveness of measures to protect the coast from erosion</li> </ul>	<p>A) <u>Knowledge</u></p> <ul style="list-style-type: none"> <li>• Sustainable management of coastal areas               <ul style="list-style-type: none"> <li>– Laws and regulations (e.g. Limit damaging activities, protect coastal resources, restrict development in areas prone to natural hazards)</li> <li>– Measures to protect the coast from erosion                   <ul style="list-style-type: none"> <li>○ Soft engineering                       <ul style="list-style-type: none"> <li>➤ Beach nourishment</li> <li>➤ Planting of vegetation</li> <li>➤ Stabilising dunes</li> <li>➤ Encouraging the growth of coral reefs</li> </ul> </li> <li>○ Hard engineering                       <ul style="list-style-type: none"> <li>➤ Seawalls</li> <li>➤ Tetrapods</li> <li>➤ Gabions</li> <li>➤ Groynes</li> <li>➤ Breakwaters</li> </ul> </li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Soft engineering</li> <li>• Hard engineering</li> </ul>
	<p>B) <u>Skills</u></p> <ul style="list-style-type: none"> <li>• Identify engineering measures adopted to mitigate coastal erosion in the field and shown in photographs and sketches</li> <li>• Analyse satellite images on changes in selected coastlines over two time periods</li> </ul>	

**Topic 2: Living With Tectonic Hazards – Risk or opportunity?**

Certain places in the world like those near plate boundaries are prone to earthquakes, volcanic eruptions and tsunamis. Such natural hazards pose dangers to people who live there and have significant impact on their quality of life. In examining the spatial patterns of these natural hazards and why such patterns exist, students have to explore the concept of plate tectonics and understand how plate movements resulting from internal earth processes create mountain systems, some large-scale landform features and tectonic hazards around the world. They will examine how and why the impact of these tectonic hazards vary greatly from place to place and consider the decision-making process that leads people to adopt certain responses when deciding to live in hazard-prone areas. Although Singapore is not at the plate boundaries, we do experience tremors and effects associated with earthquakes and volcanic eruptions occurring in neighbouring countries. Through studying this topic, students will gain an appreciation of the constraints people face and the reasons behind the different choices people make in similar situations.

Learning Outcomes	Content	Main Terms
<b>Key Question 1: Why are some areas more prone to tectonic hazards?</b>		
Students will be able to: <ul style="list-style-type: none"> <li>• Outline the main types of natural hazards</li> </ul>	A) <u>Knowledge</u> <ul style="list-style-type: none"> <li>• Definition of natural hazards and the main ways they may be classified               <ul style="list-style-type: none"> <li>– climate-related hazards                   <ul style="list-style-type: none"> <li>○ floods</li> <li>○ storms</li> </ul> </li> <li>– tectonic hazards                   <ul style="list-style-type: none"> <li>○ earthquakes</li> <li>○ volcanic eruptions</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Natural hazard</li> </ul>
<ul style="list-style-type: none"> <li>• Describe the internal structure of the Earth</li> <li>• Explain the movement of tectonic plates</li> </ul>	<ul style="list-style-type: none"> <li>• Internal structure of the Earth               <ul style="list-style-type: none"> <li>– Layered structure                   <ul style="list-style-type: none"> <li>○ Core</li> <li>○ Mantle</li> <li>○ Continental crust and oceanic crust</li> </ul> </li> <li>– Characteristics of each layer                   <ul style="list-style-type: none"> <li>○ Thickness</li> <li>○ Solid or liquid state</li> </ul> </li> </ul> </li> <li>• Movement of tectonic plates driven by the pull of subducting plates and convection currents circulating within the mantle</li> </ul>	<ul style="list-style-type: none"> <li>• Core</li> <li>• Mantle</li> <li>• Continental crust</li> <li>• Oceanic crust</li> <li>• Tectonic plate</li> <li>• Slab-pull force</li> <li>• Convection current</li> </ul>



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Learning Outcomes	Content	Main Terms
<ul style="list-style-type: none"> <li>• Describe the global distribution of tectonic plates and types of plate boundaries</li> </ul>	<ul style="list-style-type: none"> <li>• Names, types and locations of major plates and plate boundaries in the world                             <ul style="list-style-type: none"> <li>– North American Plate</li> <li>– South American Plate</li> <li>– Eurasian Plate</li> <li>– Indian Plate</li> <li>– African Plate</li> <li>– Nazca Plate</li> <li>– Pacific Plate</li> <li>– Philippine Plate</li> <li>– Australian Plate</li> </ul> </li> <li>• Types of plate boundaries and examples:                             <ul style="list-style-type: none"> <li>– Divergent: oceanic-oceanic (e.g. Mid-Atlantic Ridge), continental-continental (e.g. Great Rift Valley of East Africa)</li> <li>– Convergent: oceanic-oceanic (e.g. Mariana Trench), continental-continental (e.g. Himalayas), oceanic-continental (e.g. Andes)</li> <li>– Transform (e.g. San Andreas Fault)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Subduction zone</li> <li>• Divergent boundary</li> <li>• Convergent boundary</li> <li>• Transform boundary</li> </ul>
	<p>B) <u>Skills</u></p> <ul style="list-style-type: none"> <li>• Draw and annotate a diagram showing the internal structure of the Earth</li> <li>• Identify and label major plates and the boundary types on maps</li> <li>• Draw labelled diagrams showing the different types of movements taking place at plate boundaries</li> </ul>	

Learning Outcomes	Content	Main Terms
<b>Key Question 2: What landforms and associated tectonic phenomena are found at plate boundaries?</b>		
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Discuss how plate movements influence the general distribution of landforms and associated phenomena</li> <li>• Describe the landforms and phenomena associated with plate movements</li> <li>• Explain the causes of landforms and phenomena associated with plate movements</li> <li>• Describe the structure of volcanoes</li> <li>• Explain the characteristics of volcanoes</li> <li>• Explain the formation of volcanoes</li> <li>• Discuss the benefits and risks of living in volcanic areas</li> <li>• Discuss the impact of earthquakes on people living in areas prone to this natural hazard</li> </ul>	<p>A) <u>Knowledge</u></p> <ul style="list-style-type: none"> <li>• Plate movements and associated landforms <ul style="list-style-type: none"> <li>– Divergent: Rift valleys and block mountains</li> <li>– Convergent: Fold mountains</li> <li>– Divergent and Convergent: Volcanoes</li> </ul> </li> <li>• Phenomena and their causes <ul style="list-style-type: none"> <li>– Earthquakes</li> <li>– Tsunamis</li> <li>– Volcanic eruptions</li> </ul> </li> <li>• Structure of volcanoes <ul style="list-style-type: none"> <li>– Crater</li> <li>– Caldera</li> <li>– Vent</li> <li>– Magma chamber</li> </ul> </li> <li>• Characteristics and formation of volcanoes <ul style="list-style-type: none"> <li>– Shield volcano (e.g. Erta Ale in Ethiopia)</li> <li>– Stratovolcano (e.g. Puy de Domes in France and Mt Pinatubo in Philippines)</li> <li>– Viscosity of lava <ul style="list-style-type: none"> <li>○ high-silica vs low-silica</li> </ul> </li> </ul> </li> <li>• Benefits of living in volcanic areas <ul style="list-style-type: none"> <li>– Fertile soil</li> <li>– Precious stones and minerals</li> <li>– Tourism</li> <li>– Geothermal energy</li> </ul> </li> <li>• Risks of living in volcanic areas <ul style="list-style-type: none"> <li>– Massive destruction by volcanic materials</li> <li>– Pollution</li> </ul> </li> <li>• Risks associated with living in earthquake zones <ul style="list-style-type: none"> <li>– Disruption of services</li> <li>– Landslides</li> <li>– Destruction of properties and infrastructure</li> <li>– Loss of lives</li> <li>– Tsunamis</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Tensional force</li> <li>• Compressional force</li> <li>• Folding</li> <li>• Fold mountains</li> <li>• Rift valley</li> <li>• Block mountain</li> <li>• Volcano</li> <li>• Pacific Ring of Fire</li> <li>• Shield volcano</li> <li>• Stratovolcano</li> <li>• Crater</li> <li>• Caldera</li> <li>• Vent</li> <li>• Magma chamber</li> <li>• Magma</li> <li>• Lava</li> <li>• Viscosity</li> <li>• Geothermal energy</li> <li>• Earthquake</li> <li>• Focus</li> <li>• Epicentre</li> <li>• Richter scale</li> <li>• Aftershocks</li> <li>• Tsunami</li> <li>• Vulcanicity</li> </ul>
	<p>B) <u>Skills</u></p> <ul style="list-style-type: none"> <li>• Analyse maps and photographs of major tectonic landforms and phenomena to derive the relationship between their distribution patterns and plate boundaries (e.g. Pacific 'Ring of Fire')</li> <li>• Draw an annotated cross-section of a volcano</li> <li>• Draw labelled diagrams to show the formation of a fold mountain, a rift valley, a block mountain and a volcano</li> </ul>	

Learning Outcomes	Content	Main Terms
<b>Key Question 3: How do people prepare for and respond to earthquakes?</b>		
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Discuss the responses of people to earthquakes and tsunamis</li> <li>• Assess the effectiveness of strategies in mitigating and responding to the effects of earthquakes and tsunamis</li> </ul>	<p>A) <u>Knowledge</u></p> <ul style="list-style-type: none"> <li>• People may respond to natural hazards in several ways:               <ul style="list-style-type: none"> <li>– Preparedness measures                   <ul style="list-style-type: none"> <li>○ Land use regulation</li> <li>○ Infrastructure</li> <li>○ Emergency drills</li> <li>○ Earthquake and tsunami monitoring and warning systems</li> </ul> </li> <li>– Short-term responses                   <ul style="list-style-type: none"> <li>○ Search and rescue</li> <li>○ Emergency food and medical supplies</li> </ul> </li> <li>– Long-term responses                   <ul style="list-style-type: none"> <li>○ Rebuilding of infrastructure</li> <li>○ Provision of health care</li> </ul> </li> </ul> </li> </ul>	
	<p>B) <u>Skills</u></p> <ul style="list-style-type: none"> <li>• 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</li> </ul>	

**Theme 2: Our Changing World (Human Geography)****Topic 3: Global Tourism – Is tourism the way to go?**

Tourism is an important industry in many countries of the world. However, it has both advantages and disadvantages. The growth in tourism has an impact on people and places and requires careful management in order to ensure that it is sustainable. In Singapore, tourism is an important sector of the economy and many students also aspire to work in the industry. Through examining this topic, students will gain a better understanding of the challenges faced in the global competition for the tourist dollar and the management of tourist sites.

Learning Outcomes	Content	Main Terms
<b>Key Question 1: How does the nature of tourism vary from place to place?</b>		
Students will be able to: <ul style="list-style-type: none"> <li>• Describe and give examples of different types of tourism</li> <li>• Explain why tourist activities are different at different places</li> <li>• Discuss the roles of different groups in promoting tourism</li> </ul>	A) <u>Knowledge</u> <ul style="list-style-type: none"> <li>• Tourists are people who travel and stay away from their normal place of residence for more than 24 hours</li> <li>• Tourism may be categorised according to types of attractions offered to tourists. Different places and environments provide different opportunities for tourist activities:               <ul style="list-style-type: none"> <li>– Places of scenic beauty                   <ul style="list-style-type: none"> <li>○ Mountain regions, coastal resorts, national parks offer opportunities for honeypot tourism (e.g. Grand Canyon National Park in USA)</li> </ul> </li> <li>– Places with good facilities                   <ul style="list-style-type: none"> <li>○ MICE facilities offer opportunities to host large-scale events to attract tourists (e.g. Singapore hosted the Youth Olympic Games in 2010)</li> <li>○ Medical facilities offer opportunities for medical tourism (e.g. Singapore is a reputable medical hub in Southeast Asia)</li> <li>○ Theme parks (e.g. Disneyland in Japan)</li> </ul> </li> <li>– Places with rich culture offer opportunities for                   <ul style="list-style-type: none"> <li>○ Heritage tourism (e.g. Machu Picchu in Peru)</li> <li>○ Film-induced tourism (e.g. Lotte World in South Korea is the filming site for Stairway to Heaven)</li> <li>○ Pilgrimage tourism (e.g. Mecca in Saudi Arabia)</li> </ul> </li> <li>– Places of conflicts offer opportunities for dark tourism (e.g. Tuol Sleng Genocide Museum in Cambodia)</li> </ul> </li> <li>• Role of different groups in tourism               <ul style="list-style-type: none"> <li>– Government</li> <li>– Media (e.g. Travel writers)</li> <li>– International organisations</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Tourist</li> <li>• MICE</li> <li>• Honeypot tourism</li> <li>• Medical tourism</li> <li>• Film-induced tourism</li> <li>• Heritage tourism</li> <li>• Pilgrimage tourism</li> <li>• Dark tourism</li> </ul>
	B) <u>Skills</u> <ul style="list-style-type: none"> <li>• Classify key global tourist attractions by type</li> <li>• With reference to a map, describe distribution of key global tourist attractions by type</li> <li>• Identify key features of specific tourist sites and associated tourist activities</li> </ul>	

Learning Outcomes	Content	Main Terms
<b>Key Question 2: Why has tourism become a global phenomenon?</b>		
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Describe the trends of both domestic tourism and international tourism</li> <li>• Describe the changing nature of global tourism</li> <li>• Explain the growth of global tourism</li> </ul>	<p>A) <u>Knowledge</u></p> <ul style="list-style-type: none"> <li>• Trends in the global tourism industry in terms of destinations, country of origin and tourist dollars for: <ul style="list-style-type: none"> <li>– Domestic tourism</li> <li>– International tourism</li> </ul> </li> <li>• Evolution of mass tourism in the form of the package holiday to niche tourism such as eco-tourism</li> <li>• Development of short haul destinations and the growth of long haul destinations</li> <li>• Reasons for the growth of global tourism <ul style="list-style-type: none"> <li>– Developments in technology <ul style="list-style-type: none"> <li>○ Better and affordable transport</li> <li>○ E-services: online booking of tours and tickets</li> <li>○ Ease of access of information</li> </ul> </li> <li>– Demand factors arising from changing profile of tourists <ul style="list-style-type: none"> <li>○ Disposable income</li> <li>○ Leisure time</li> <li>○ Changing lifestyle</li> </ul> </li> <li>– Destination factors <ul style="list-style-type: none"> <li>○ Attractions</li> <li>○ Investment in infrastructure and services</li> <li>○ Access to information</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Domestic tourism</li> <li>• International tourism</li> <li>• Mass tourism</li> <li>• Niche tourism</li> <li>• Package holiday</li> <li>• Short haul destinations</li> <li>• Long haul destinations</li> <li>• Eco-tourism</li> <li>• Technology</li> <li>• Budget airlines</li> <li>• Tourist profile</li> <li>• Demand factors</li> <li>• Disposable income</li> <li>• Changing lifestyle</li> <li>• Destination factors</li> </ul>
<ul style="list-style-type: none"> <li>• Explain why tourism is subject to fluctuations</li> </ul>	<ul style="list-style-type: none"> <li>• Impact of events that hinder the growth of tourism <ul style="list-style-type: none"> <li>– Disasters (e.g. Japan tsunami in 2011)</li> <li>– Recessions (e.g. Global recession of 2008–2011)</li> <li>– Political situations (e.g. Thailand political unrest in 2010)</li> <li>– Diseases (e.g. Germany E. Coli outbreak in 2010)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Fluctuation</li> </ul>
	<p>B) <u>Skills</u></p> <ul style="list-style-type: none"> <li>• Extract information on trends in global tourist industry from graphs or tables</li> <li>• Extract information on factors affecting growth of the global tourist industry from maps, graphs or tables</li> <li>• Analyse tourist revenues using diagrams such as bar graph and pie chart</li> <li>• Analyse top tourist destinations and tourist origins for a selected country using flow maps and pie charts</li> </ul>	

Learning Outcomes	Content	Main Terms
<b>Key Question 3: Developing tourism at what cost?</b>		
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Assess the impact of tourism on a country</li> <li>• Explain how tourism can be made sustainable</li> <li>• Discuss the roles of various groups in taking care of the tourist areas</li> </ul>	<p>A) <u>Knowledge</u></p> <ul style="list-style-type: none"> <li>• Impact of the growth of tourism on a country                             <ul style="list-style-type: none"> <li>– Economic                                     <ul style="list-style-type: none"> <li>○ Advantages   <ul style="list-style-type: none"> <li>➤ Employment opportunities</li> <li>➤ Growth in income</li> <li>➤ Development of infrastructure and facilities</li> </ul> </li> <li>○ Disadvantages   <ul style="list-style-type: none"> <li>➤ Seasonal unemployment</li> <li>➤ Under-use of facilities at certain times of the year</li> <li>➤ Shortage of services</li> </ul> </li> </ul> </li> <li>– Socio-cultural                                     <ul style="list-style-type: none"> <li>○ Advantages   <ul style="list-style-type: none"> <li>➤ Preservation of local customs and heritage</li> </ul> </li> <li>○ Disadvantages   <ul style="list-style-type: none"> <li>➤ Dilution of local customs and heritage</li> <li>➤ Increased crime</li> </ul> </li> </ul> </li> <li>– Environmental                                     <ul style="list-style-type: none"> <li>○ Advantages   <ul style="list-style-type: none"> <li>➤ Conservation of natural environments</li> </ul> </li> <li>○ Disadvantages   <ul style="list-style-type: none"> <li>➤ Vandalism</li> <li>➤ Littering and pollution</li> <li>➤ Destruction of habitats</li> <li>➤ Carbon footprint</li> <li>➤ Increased congestion</li> </ul> </li> </ul> </li> </ul> </li> <li>• Managing the impact of tourism                             <ul style="list-style-type: none"> <li>– Conserve fragile environments</li> <li>– Promote sustainable tourism through laws and regulation and support from local population</li> <li>– Responsibilities of various groups in conserving and protecting tourist areas                                     <ul style="list-style-type: none"> <li>○ Local communities through community-based tourism</li> <li>○ Visitors</li> <li>○ Tour operators</li> <li>○ Planning authorities</li> <li>○ Non-governmental organisations (e.g. The International Ecotourism Society)</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Employment</li> <li>• Infrastructure development</li> <li>• Preservation</li> <li>• Custom</li> <li>• Heritage</li> <li>• Carbon footprint</li> <li>• Conservation</li> <li>• Fragile environment</li> <li>• Sustainable tourism</li> <li>• Eco-tourism</li> <li>• Community-based tourism</li> </ul>
	<p>B) <u>Skills</u></p> <ul style="list-style-type: none"> <li>• Extract information from sources regarding tourism in a selected country</li> <li>• Design questionnaires – layout, format, wording and number of questions</li> </ul>	

**Topic 4: Food Resources – Is technology a panacea for food shortage?**

Food is an important resource issue in contemporary society. This topic focuses on food consumption, production and distribution patterns in societies. It looks at the perplexing problem of why there is hunger in some societies while others enjoy excess food provision that results in obesity and food wastage. Students will examine the role and impact of technology in raising yields to combat the food shortage problem. In the light of growing world population and the challenges of environment sustainability, solutions to the issue of hunger may be in continuing the intensification of farming practices in the midst of global climate change, changing the food supply and distribution chains or population control.

Learning Outcomes	Content	Main Terms
<b>Key Question 1: How and why has food consumption patterns changed since 1960s?</b>		
Students will be able to: <ul style="list-style-type: none"> <li>• Describe variations in global food consumption patterns between DCs and LDCs over time</li> <li>• Describe the changing food preferences in DCs and LDCs</li> <li>• Explain why variations exist and persist in food consumption between DCs and LDCs</li> </ul>	A) <u>Knowledge</u> <ul style="list-style-type: none"> <li>• Variations in global food consumption patterns between DCs and LDCs over time, in terms of               <ul style="list-style-type: none"> <li>– Indicators of food consumption                   <ul style="list-style-type: none"> <li>○ Consumption/kg/yr</li> <li>○ Starchy staples as percentage of all calories</li> <li>○ Total daily calorie intake</li> </ul> </li> <li>– Changing food preferences</li> </ul> </li> <li>• Reasons for the growth and variations in food consumption               <ul style="list-style-type: none"> <li>– Economic                   <ul style="list-style-type: none"> <li>○ Disposable income</li> <li>○ Pricing</li> </ul> </li> <li>– Socio-cultural                   <ul style="list-style-type: none"> <li>○ Food preferences: organic food and fast food</li> <li>○ Population growth</li> </ul> </li> <li>– Political                   <ul style="list-style-type: none"> <li>○ Stability of food supply</li> <li>○ Food safety</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Food</li> <li>• Staple food</li> <li>• Food consumption per capita</li> <li>• Daily calorie intake</li> <li>• Food preference</li> <li>• Disposable income</li> <li>• Organic food</li> </ul>

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Learning Outcomes	Content	Main Terms
<ul style="list-style-type: none"> <li>• Discuss the impact of variations in food consumption on individuals within DCs and LDCs</li> </ul>	<ul style="list-style-type: none"> <li>• Impact of inadequate food consumption on individuals and countries                             <ul style="list-style-type: none"> <li>– Health                                     <ul style="list-style-type: none"> <li>○ Malnutrition</li> <li>○ Starvation</li> </ul> </li> <li>– Economic                                     <ul style="list-style-type: none"> <li>○ Lower productivity</li> <li>○ Food aid and economic aid can cause long term debts</li> <li>○ Diversion of financial resources to health care</li> </ul> </li> <li>– Political                                     <ul style="list-style-type: none"> <li>○ Social unrest</li> </ul> </li> <li>– Social                                     <ul style="list-style-type: none"> <li>○ Scavenging</li> </ul> </li> </ul> </li> <li>• Impact of excess food consumption on individuals and countries                             <ul style="list-style-type: none"> <li>– Health                                     <ul style="list-style-type: none"> <li>○ Obesity and related illnesses</li> </ul> </li> <li>– Economic                                     <ul style="list-style-type: none"> <li>○ Lower productivity</li> <li>○ Diversion of financial resources to health care</li> </ul> </li> <li>– Social issues                                     <ul style="list-style-type: none"> <li>○ Food wastage</li> <li>○ Dieting</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Malnutrition</li> <li>• Starvation</li> <li>• Social unrest</li> <li>• Scavenging</li> <li>• Obesity</li> </ul>
	<p>B) <u>Skills</u></p> <ul style="list-style-type: none"> <li>• Compare food consumption levels between DCs and LDCs shown in maps or graphs</li> <li>• Compare how food consumption patterns are influenced by changes in income</li> </ul>	



Learning Outcomes	Content	Main Terms
<b>Key Question 2: What are the trends and challenges in production of food crops?</b>		
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Describe and explain the trends in production of food crops since 1960s</li> <li>• Discuss the factors affecting the intensity of food production</li> </ul>	<p>A) <u>Knowledge</u></p> <ul style="list-style-type: none"> <li>• Trends in production of food crops like rice and wheat from 1960s               <ul style="list-style-type: none"> <li>– Increased intensity of production of food crops</li> </ul> </li> <li>• Factors affecting the intensity of food production               <ul style="list-style-type: none"> <li>– Physical                   <ul style="list-style-type: none"> <li>○ Relief</li> <li>○ Soils and drainage</li> <li>○ Climate</li> </ul> </li> <li>– Economic                   <ul style="list-style-type: none"> <li>○ Purpose of farming: commercial and subsistence</li> <li>○ Demand and capital</li> <li>○ Agri-business</li> </ul> </li> <li>– Political                   <ul style="list-style-type: none"> <li>○ Government policy</li> <li>○ ASEAN</li> </ul> </li> <li>– Technological advances                   <ul style="list-style-type: none"> <li>○ Green Revolution through use of high yielding varieties, irrigation, mechanisation, fertilisers and pesticides</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Crop yield (ton/hectare)</li> <li>• Subsistence farming</li> <li>• Commercial farming</li> <li>• Intensification</li> <li>• Productivity (output per unit area/labour per unit area)</li> <li>• Agri-business</li> <li>• High yielding varieties</li> <li>• Irrigation</li> <li>• Fertilisers</li> <li>• Pesticides</li> <li>• Green Revolution</li> </ul>
<ul style="list-style-type: none"> <li>• Discuss the effects of intensification of food production activities on water and soil quality</li> <li>• Discuss the causes of food shortage</li> </ul>	<ul style="list-style-type: none"> <li>• Challenges associated with intensification of production of crops from 1960s               <ul style="list-style-type: none"> <li>– Effects of use of irrigation and chemicals on water and soil quality</li> </ul> </li> <li>• Causes of food shortage               <ul style="list-style-type: none"> <li>– Physical                   <ul style="list-style-type: none"> <li>○ Extreme weather</li> <li>○ Climate change</li> <li>○ Pests</li> </ul> </li> <li>– Political                   <ul style="list-style-type: none"> <li>○ Civil strife</li> <li>○ Poor governance</li> </ul> </li> <li>– Economic                   <ul style="list-style-type: none"> <li>○ Rising demand for meat and dairy products from emerging economies like China and India</li> <li>○ Soaring cost of fertilisers and transport</li> <li>○ Conversion of farmland to industrial crop production to produce biofuel crops</li> </ul> </li> <li>– Social                   <ul style="list-style-type: none"> <li>○ Lack of accessibility</li> <li>○ Inadequate logistics of food distribution and storage</li> <li>○ Rapid population growth</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Salinisation</li> <li>• Eutrophication</li> <li>• Extreme weather</li> <li>• Governance</li> <li>• Cash crops</li> <li>• Biofuel</li> <li>• Food security</li> <li>• Stock piling</li> <li>• Food distribution</li> </ul>

Learning Outcomes	Content	Main Terms
	<p>B) <u>Skills</u></p> <ul style="list-style-type: none"> <li>• Identify areas on maps where major crops (rice and wheat) are grown</li> <li>• Describe how interaction between physical and human environments affects food production from maps and photographs</li> <li>• With reference to a given resource, describe the range of products produced by an agri-business and its spatial network</li> </ul>	
<b>Key Question 3: How can the problem of food shortage be addressed?</b>		
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Explain strategies adopted to alleviate the problem of food shortage</li> <li>• Evaluate the effectiveness of technological strategies to solve the problem of food shortage</li> </ul>	<p>A) <u>Knowledge</u></p> <ul style="list-style-type: none"> <li>• Strategies to overcome food shortage                             <ul style="list-style-type: none"> <li>– Technological                                     <ul style="list-style-type: none"> <li>○ Storage (e.g. refrigeration and transport)</li> <li>○ Farming technology (e.g. Green Revolution)</li> <li>○ Biotechnology: Genetically modified food   <ul style="list-style-type: none"> <li>➢ Characteristics (e.g. high yield and longer shelf life)</li> <li>➢ Positive impacts (e.g. economic and regional development)</li> <li>➢ Negative impacts (e.g. reduction of biodiversity and habitat loss)</li> </ul> </li> </ul> </li> <li>– Agricultural                                     <ul style="list-style-type: none"> <li>○ Multiple cropping and crop rotation</li> <li>○ Water and soil conservation</li> <li>○ Lease of farmland to other countries</li> </ul> </li> <li>– Social                                     <ul style="list-style-type: none"> <li>○ Support local farmers</li> <li>○ Population control</li> </ul> </li> <li>– Political/economic                                     <ul style="list-style-type: none"> <li>○ Food programmes and aid assistance (e.g. UNWFP)</li> <li>○ Agricultural policies (e.g. high-tech farming in Singapore)</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Genetically modified food</li> <li>• Multiple cropping</li> <li>• Crop rotation</li> <li>• Soil conservation</li> <li>• Food aid</li> </ul>
	<p>B) <u>Skills</u></p> <ul style="list-style-type: none"> <li>• Interpret data on countries with inadequate food supply from maps and graphs</li> <li>• Interpret variations in food shortage within a country using maps, graphs, texts and diagrams</li> </ul>	

**Theme 3: Geographical Skills and Investigations****Topic 5: Topographical Map Reading Skills (For Papers 1 and 2)**

Candidates will be expected to be familiar with topographical maps. Any map provided will contain a key. Questions will be set based at least in part on the topics in the syllabus. However, there will be instances where candidates will be expected to identify and describe other features as itemised in the following table.

Candidates should be able to:

<b>Read</b>	<ul style="list-style-type: none"> <li>grid references (4- and 6-figure grid references)</li> <li>direction (both compass and bearings from grid north)</li> </ul>
<b>Interpret</b>	<ul style="list-style-type: none"> <li>scales (representative fraction, line/linear and statement)</li> <li>symbols</li> <li>human activity from map evidence</li> </ul>
<b>Calculate</b>	<ul style="list-style-type: none"> <li>distances (straight-line and winding distances)</li> </ul>
<b>Identify</b>	<ul style="list-style-type: none"> <li>broad areas of relief (low river valley region, steep sided uplands)</li> <li>physical features associated with coastlines (e.g. headland, cliff, shore platform, tombolo, spit, bay, beach, corals) and landforms such as mountain, valley and flood plain</li> </ul>
<b>Describe</b>	<ul style="list-style-type: none"> <li>relief using contour intervals</li> <li>nature of relief using geographical terms (broad, flat, steep-sided, deeply cut, gently sloping, convex, concave)</li> <li>patterns and location of vegetation, land-use and communication</li> <li>cross-sections (including annotation) for interpretations. (Candidates will not be asked to construct them)</li> </ul>
<b>Explain</b>	<ul style="list-style-type: none"> <li>relationship between land use or communications and relief</li> </ul>

**Topic 6: Geographical Data and Techniques (For Papers 1 and 2)**

Candidates should develop skills and techniques to interpret and evaluate geographical data. They will also be asked to construct or complete the presentation of geographical data so as to present them in an appropriate way in the examinations. Individual questions on data presentation will be capped at a maximum of 3 marks. Sources of data will include books, journals, news reports, maps at a range of scales, statistics, censuses, graphs, questionnaires, photographs, remotely sensed images, interviews, information held in Geographic Information Systems and other information technology databases.

Candidates should be familiar with the following types of data presentation methods:

<b>Maps and Symbols</b>	Base maps, Sketch maps, Topographic maps, Road maps, Atlases, Choropleth maps, Isoline maps, Dot maps, Maps with proportional symbols (including flow line maps)
<b>Photographs</b>	Aerial photographs (vertical and oblique), Landscape photographs, Satellite images
<b>Graphs</b>	<u>Line Graphs</u> : Simple line graphs, Comparative line graphs <u>Bar graphs</u> : Simple bar graphs, Comparative bar graphs <u>Others</u> : Pie charts, Scatter graphs with lines of best fit*
<b>Others</b>	Texts, Diagrams, Tables, Cartoons, Field sketches, Cross sections and Transects

Candidates should be able to construct or complete the presentation of data using the following data presentation methods:

<b>Graphs</b>	<u>Line Graphs</u> : Simple line graphs <u>Bar graphs</u> : Simple bar graphs <u>Others</u> : Pie charts, Scatter graphs with lines of best fit*
<b>Others</b>	Texts, Diagrams, Tables and Field sketches

\*No calculation is required; best fit lines would be visual and indicate trends.

Candidates should be able to calculate the following:

<b>Statistical calculations to show patterns and changes</b>	Percentages Ratios Mean
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Candidates should be able to:

- Describe landscape (physical and human) or geographical phenomena from photographs. The ability to describe and explain physical and human landscapes and the physical-human interrelationships shown on photographs is essential. Attention should be given to drawing simple sketches of photographs and annotating them to illustrate the features. They should also be able to recognise patterns and deduce relationships from photographs.
- Identify and briefly describe physical and/or human features. They should be able to explain physical-human inter-relationships, for example, the processes or factors affecting the physical and human environments.
- Extract and interpret information from graphs and other data presentations as indicated in the above table. Using data provided, they should be able to construct/complete a variety of geographical data presentations as indicated in the above table. They should also be able to undertake simple statistical calculations, describe trends and deduce relationships from graphs and other data presentations.
- Produce sketch maps as an integral part of the presentation of information. The drawing of sketch maps and sketch sections, especially with annotations should be seen as a valuable aid in supporting information given in written accounts. This form of presentation is encouraged in the examination.

### **Topic 7: Geographical Investigations (Only for Section A of Paper 1)**

Candidates should be familiar with the inquiry approach to fieldwork, namely (a) formulate aims and hypotheses/guiding questions, (b) inquiry skills and techniques to collect data, (c) make analyses of data, (d) presentation techniques to display data, and (e) form conclusions.

Formulating aims and hypotheses/guiding questions: Candidates should be familiar with hypotheses/guiding questions as statements that form the basis of fieldwork. The hypotheses may investigate a geographical concept e.g. 'Constructive waves give rise to shores of gentler gradients', 'The impact of tourism on an attraction is more positive than negative', 'Tourist activities are more sustainable in an urban area than in a rural area'. Guiding questions like 'Why are the beaches at X different in profile and sediment from those at Y?' may focus candidates to answer a question or solve a problem. Steps to testing hypotheses or answering guiding questions include data collection, data analysis, data presentation and drawing conclusions from data.

**Data collection:** Candidates should be familiar with the following types of skills in fieldwork and the associated considerations:

- (i) Observation – This is an inquiry skill to collect and record data through observation of physical features and human activities. Field sketches, annotated photographs, recording sheets and maps may all be used to record observations.
- (ii) Measurement – When recording measurements, due consideration should be given to planning the layout of the recording sheet, the location of instruments and the sampling methods adopted to provide reliable data. For example, in physical geography topics, candidates need to know the equipment (e.g. clinometer) and techniques used.
- (iii) Questionnaires – In human geography, consideration should be given to factors influencing the successful design of questionnaires (e.g. layout, format and wording of questions and the number of questions) and the conduct of the questionnaires (e.g. the sampling methods – random, systematic, stratified, pilot survey, and location of survey).
- (iv) Interviews – This method should be used to collect in-depth information from a specific person or group of people. The interviewer should be reflective and take into consideration issues such as gender, experience and socio-economic status and also observe interview etiquette.

**Data analysis:** Candidates should be able to describe and analyse the patterns and trends in data collected and suggest relationships. They should be able to apply relevant geographical knowledge and understanding when interpreting and analysing the data.

**Data presentation techniques:** Candidates should have the knowledge and skill to present data using illustrations appropriate to the type of geographical investigation undertaken.

**Forming conclusions:** Using evidence from the data, candidates should be able to make judgements on the validity of the original hypothesis or reach a conclusion to answer the guiding question. They should also comment on the reliability of the data collected and evaluate the data collection methods used.

## **GLOSSARY OF TERMS**

The glossary of terms in this syllabus is explained below. The list is to be used as a guide. It is neither definitive nor exhaustive. The glossary has been deliberately kept brief with respect to the descriptions of meanings. Candidates should appreciate that the meaning of a term must depend in part on its context.

<b>Term</b>	<b>Explanation</b>
Account for	<ul style="list-style-type: none"> <li>• Write about why something occurs or happens</li> <li>• May also be written as 'give reasons for', 'suggest reasons for'</li> </ul>
Analyse	<ul style="list-style-type: none"> <li>• Break the content of a topic / information into its constituent parts and give an in-depth account</li> </ul>
Annotate	<ul style="list-style-type: none"> <li>• Add labels of notes or short comments, usually to a diagram, map or photograph to describe or explain</li> </ul>
Assess	<ul style="list-style-type: none"> <li>• Provide arguments based on knowledge and understanding on both sides/ for and against and reach a conclusion based on the evidence</li> <li>• May also be written as 'how far do you agree', 'how true is this statement', 'to what extent do you agree with this statement'</li> </ul>
Calculate	<ul style="list-style-type: none"> <li>• Provide a numerical answer. In general, working should be shown, especially where two or more steps are involved.</li> </ul>

Term	Explanation
Comment on	<ul style="list-style-type: none"> <li>Provide your views about something, possibly to offer some explanation on it or to infer something which could be responsible for, or develop from it.</li> </ul>
Compare	<ul style="list-style-type: none"> <li>Provide an account of the similarities and differences between two sets of information or two areas</li> <li>Two separate descriptions do not make a comparison</li> </ul>
Complete	<ul style="list-style-type: none"> <li>To add the remaining detail or details required</li> </ul>
Contrast	<ul style="list-style-type: none"> <li>Write about the point(s) of difference between two things</li> </ul>
Define	<ul style="list-style-type: none"> <li>Give the definition or meaning of a word or phrase</li> <li>May also be written as 'explain the meaning of', 'what is meant by'</li> </ul>
Describe	<ul style="list-style-type: none"> <li>Write about what something is like or where it is</li> </ul>
Discuss	<ul style="list-style-type: none"> <li>Analyse and evaluate different points of view</li> </ul>
Draw	<ul style="list-style-type: none"> <li>Make a sketch of a geographical form</li> <li>May also be written as 'using a diagram', 'illustrate with a sketch'</li> </ul>
Explain	<ul style="list-style-type: none"> <li>See 'Account for'</li> </ul>
Evaluate	<ul style="list-style-type: none"> <li>See 'Assess'</li> </ul>
Give an explanatory account	<ul style="list-style-type: none"> <li>Provide a description of something together with an explanation for it</li> <li>May also be written as 'give a reasoned account'</li> </ul>
How	<ul style="list-style-type: none"> <li>Prove/demonstrate/show (depending on question) in what way / to what extent / by what means or method</li> </ul>
Identify	<ul style="list-style-type: none"> <li>Pick up something from information you have been given</li> </ul>
Illustrating your answers	<ul style="list-style-type: none"> <li>Support your answers by using specific examples or diagrams</li> </ul>
Insert	<ul style="list-style-type: none"> <li>Place specific names or details to an illustrative technique</li> <li>May also be written as 'label'</li> </ul>
Justify	<ul style="list-style-type: none"> <li>Give an explanation why something is chosen or why it is done in a particular manner or why a particular position/stand is taken</li> </ul>
List	<ul style="list-style-type: none"> <li>Identify or name a number of specific features to meet a particular purpose</li> </ul>
Locate	<ul style="list-style-type: none"> <li>Find where something is placed or state where something is found or mark it on a map or diagram</li> </ul>
Name	<ul style="list-style-type: none"> <li>State/specify/identify using a word or words by which a specific feature is known or give examples which illustrate a particular feature</li> </ul>
Outline	<ul style="list-style-type: none"> <li>Provide a brief description or explanation</li> </ul>
Predict	<ul style="list-style-type: none"> <li>Use your own knowledge and understanding along with information provided to state what might happen next</li> </ul>

Term	Explanation
Refer to	<ul style="list-style-type: none"> <li>• Write an answer which uses some of the ideas provided in an illustrative technique or other additional material such as a case study</li> <li>• May also be written as 'with reference to'</li> </ul>
State	<ul style="list-style-type: none"> <li>• Write in brief detail using a short statement, words or a single word</li> </ul>
Study	<ul style="list-style-type: none"> <li>• Examine closely, pay special attention to, look carefully at</li> </ul>
Suggest	<ul style="list-style-type: none"> <li>• Write down ideas on or knowledge of something</li> </ul>
Use	<ul style="list-style-type: none"> <li>• Base answer on information provided</li> <li>• May also be written as 'using the information provided'</li> </ul>
What	<ul style="list-style-type: none"> <li>• Used to form a question concerned with selective ideas/details/factors</li> </ul>
Where	<ul style="list-style-type: none"> <li>• At what place? To what place? From what place?</li> </ul>
Why	<ul style="list-style-type: none"> <li>• Provide the cause or reason</li> </ul>
With the help of information in	<ul style="list-style-type: none"> <li>• Use some of the information provided as well as additional material</li> </ul>