WJEC Eduqas GCE A LEVEL GEOGRAPHY

For teaching from 2016
For award from 2018

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GCE A LEVEL GEOGRAPHY

SUMMARY OF ASSESSMENT

Component 1: Changing Landscapes and Changing Places **Written examination: 2 hours 15 minutes** **30% of qualification**
Section A: Changing Landscapes Choice between two themes, **either** Coastal **or** Glaciated Landscapes: two compulsory structured questions and data response **Section B: Changing Places** Two compulsory structured questions and data response
Component 2: Global Systems and Global Governance **Written examination: 2 hours 15 minutes** **30% of qualification**
Section A: Global Systems Water and Carbon Cycles: two compulsory structured questions and data response **Section B: Global Governance: Change and Challenges** Processes and patterns of global migration and global governance of the Earth's oceans: two compulsory structured questions and data response
Component 3: Contemporary Themes in Geography **Written examination: 2 hours** **20% of qualification**
Section A: Tectonic Hazards One compulsory extended response question **Section B: Contemporary Themes in Geography** Five optional themes: • Ecosystems • Economic Growth and Challenge: India or China • Energy Challenges and Dilemmas • Weather and Climate • Development in an African Context Two essay questions chosen from these five optional themes
Component 4: Independent Investigation **Non-exam assessment: 3000 to 4000 words** **20% of qualification**
One written independent investigation, based on the collection of both primary data and secondary information

This linear qualification will be available in the summer series each year. It will be awarded for the first time in summer 2018.

Qualification Accreditation Number:

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GCE A LEVEL GEOGRAPHY

1 INTRODUCTION

1.1 Aims and objectives

The WJEC Eduqas A level Geography specification encourages learners to apply geographical knowledge, theory and skills to the world around them. In turn this will enable learners to develop a critical understanding of the world's people, places and environments in the 21st century. Learners should be able to develop both knowledge and understanding of contemporary geographical concepts together with transferable skills that will enable learners to progress to higher education and a range of employment opportunities.

The focus of the specification is to develop an enthusiasm for and competence in geography by using contemporary real-world contexts, from a range of specified spatial scales, and through engagement with and practical application of geographical skills and techniques in the field. This specification draws on both physical and human geography, explores people-environment interactions and encourages development of fieldwork at the local level to enable learners to pose enquiry questions.

The specification covers the required subject content at an appropriate level of rigour and challenge for a GCE A level qualification. The content is organised into the required core and non-core themes. The non-core content is presented as one compulsory theme and a series of optional themes based on contemporary issues in geography. These non-core themes allow for rigour and in-depth treatment and also provide flexibility for teachers to select themes to develop a course of study suited both to their interests and circumstances. The specialised concepts and geographical skills (quantitative and qualitative skills and approaches) as noted below in the aims and objectives are embedded in the core and non-core content.

The WJEC Eduqas A level in Geography requires learners to:

- develop their knowledge of locations, places, processes and environments, at all geographical scales from local to global across the specification as a whole
- develop an in-depth understanding of the selected core and non-core processes in physical and human geography at a range of temporal and spatial scales, and of the concepts which illuminate their significance in a range of locational contexts
- recognise and be able to analyse the complexity of people-environment interactions at all geographical scales, and appreciate how these underpin understanding of some of the key issues facing the world today

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- develop their understanding of, and ability to apply, the concepts of place, space, scale and environment, that underpin both the national curriculum and GCSE, including developing a more nuanced understanding of these concepts
- gain understanding of **specialised concepts** relevant to the core and non-core content. These must include the concepts of causality, equilibrium, feedback, identity, inequality, interdependence, globalisation, mitigation and adaptation, representation, risk, resilience, sustainability, systems, and thresholds
- improve their understanding of the ways in which values, attitudes and circumstances have an impact on the relationships between people, place and environment, and develop the knowledge and ability to engage, as citizens, with the questions and issues arising
- become confident and competent in selecting, using and evaluating a range of **quantitative and qualitative skills and approaches**, (including observing, collecting and analysing geo-located data) and applying them as an integral part of their studies
- understand the fundamental role of fieldwork as a tool to understand and generate new knowledge about the real world, and become skilled at planning, undertaking and evaluating fieldwork in appropriate situations
- apply geographical knowledge, understanding, skills and approaches in a rigorous way to a range of geographical questions and issues, including those identified in fieldwork, recognising both the contributions and limitations of geography
- develop as critical and reflective learners, able to articulate opinions, suggest relevant new ideas and provide evidenced argument in a range of situations.

Aims and objectives as listed in the DfE *Geography GCE AS and A Level Subject Content* (December 2014).

1.2 Prior learning and progression

Any requirements set for entry to a course following this specification are at the discretion of centres. It is reasonable to assume that many learners will have achieved qualifications equivalent to Level 2 at KS4. Skills in Numeracy / Mathematics, Literacy / English and Information Communication Technology will provide a good basis for progression to this Level 3 qualification.

This specification builds on the knowledge, understanding and skills established at GCSE and particularly aims to develop a deeper understanding of, and ability to apply, the concepts of place, space, scale and environment. Some learners may have already gained knowledge, understanding and skills through their study of geography at AS.

This specification provides a suitable foundation for the study of geography or a related area through a range of higher education courses, progression to the next level of vocational qualifications or employment. In addition, the specification provides a coherent, satisfying and worthwhile course of study for learners who do not progress to further study in this subject.

This specification is not age specific and, as such, provides opportunities for learners to extend their life-long learning.

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1.3 Equality and fair access

This specification may be followed by any learner, irrespective of gender, ethnic, religious or cultural background. It has been designed to avoid, where possible, features that could, without justification, make it more difficult for a learner to achieve because they have a particular protected characteristic.

The protected characteristics under the Equality Act 2010 are age, disability, gender reassignment, pregnancy and maternity, race, religion or belief, sex and sexual orientation.

The specification has been discussed with groups who represent the interests of a diverse range of learners, and the specification will be kept under review.

Reasonable adjustments are made for certain learners in order to enable them to access the assessments (e.g. learners are allowed access to a Sign Language Interpreter, using British Sign Language). Information on reasonable adjustments is found in the following document from the Joint Council for Qualifications (JCQ): *Access Arrangements, Reasonable Adjustments and Special Consideration: General and Vocational Qualifications.*

This document is available on the JCQ website (www.jcq.org.uk). As a consequence of provision for reasonable adjustments, very few learners will have a complete barrier to any part of the assessment.

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2 SUBJECT CONTENT

The subject content focuses on the dynamic nature of physical systems and processes in the real world, and on the interactions and connectivity between people, places and environments in both time and space. The core themes are divided into separate physical and human themes. The non-core content draws on both physical and human geography and also people-environment interactions. All themes integrate geographical skills, scale and specialised concepts. Appendix A lists the geographical skills relevant to this specification. Appendix B exemplifies opportunities within this specification for development of these skills.

In Component 1 learners will develop knowledge and understanding of core content primarily at the local level, although wider scales are addressed where appropriate to the context. This component provides a range of opportunities for fieldwork, although the content of Components 2 and 3 can be used to extend fieldwork and enquiry questions.

In Component 2 learners will develop knowledge and understanding of core content at the global level.

In Component 3 learners will develop a critical understanding and in-depth knowledge of selected non-core physical and human processes, their linkages and the inter-relationships between people and environment.

Fieldwork must be integrated into study and must be used to build a foundation for the non-exam assessment. The non-exam assessment is addressed in Component 4 and consists of an independent investigation; it requires reflective, extended written research, based on an independently selected research question linked to the specification. Appendix D lists suggested opportunities for fieldwork to provide possible starting points.

Within the specification an introduction to each theme is followed by the required knowledge and understanding, which is set out in two columns. The focus of study is presented in the first column, with amplification of the geographical content in the second column. The introduction to each theme presents a rationale of the content and details the specialised concepts central to each theme. The rationale will not be assessed. Knowledge and understanding of the specialised concepts helps learners to develop as critical and reflective learners with the capability to analyse, interpret and evaluate key geographical information and issues; this enables learners to think like geographers. There is no hierarchy implied by the order in which the content is presented in each theme, but it reflects the order in which it will appear in the assessment component.

Examples and case studies selected for study by centres to exemplify the content must be contemporary, that is within the last two decades, unless an historical context is useful for a time dimension, which also informs the present context. Case studies and examples are not listed throughout this specification; instead learners are expected to demonstrate independent learning through the selection of examples and case studies. These examples and case studies should enable learners to develop knowledge and understanding of place, context and scale to reinforce the specialised concepts. Where case studies are specified this is to highlight a context appropriate to the content.

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2a The place of applied fieldwork in the specification

Geographical fieldwork is defined as applying specific geographical knowledge, understanding and skills to a particular and real out-of-classroom context. In total, the equivalent of at least four days of geographical fieldwork must be undertaken as required in the subject content. These days must be the equivalent of two days on physical geography fieldwork and two days on human geography fieldwork.

Overall, this fieldwork will enable learners to develop:

- the required geographical skills
- the required knowledge and understanding of the six stages of enquiry process central to this specification (as below), which will underpin the requirements in Component 4, the independent investigation.

One or more of these fieldwork days may directly provide the starting point for the independent investigation in Component 4.

A suitable starting point for the fieldwork is Changing Landscapes and Changing Places, the focus of Component 1, on coastal or glaciated landscapes and changing places. Their emphasis on the local scale is well suited to fieldwork. Appendix D lists specific opportunities to develop appropriate fieldwork. Geographical skills appropriate to fieldwork should be selected from Appendix A.

The six stages of the enquiry process

The enquiry process forms the framework for application of the fieldwork and geographical skills. Knowledge and understanding of the six stages will be developed overall through the fieldwork and each of the days undertaken may focus on some of the aspects of the six stages; that is all the geographical skills involved in the enquiry process need not be undertaken on the fieldwork days. The aim should be to build by the end of the fieldwork a holistic understanding of the six stages.

Sequence and enquiry questions	**Geographical skills**
1. Planning – what is the geographical enquiry process?	Prepare to investigate a geographical question in the field; make and justify decisions on the task including data collection methods
2. Data collection – how is data and information (evidence) collected?	Acquire primary and secondary data / information pertinent to the research question using quantitative and qualitative methods and primary and secondary data / information
3. Presentation and display – how is the collected data and information presented?	Process data / information using quantitative and qualitative methods
4. Analysis and interpretation of findings – how can the evidence be analysed?	Interpret and analyse data / information from primary sources, and, as relevant, secondary data / information; describe patterns, trends, relationships; apply knowledge and understanding of geographical concepts and processes to specific evidence collected

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5. Conclusion – what conclusions can be drawn and how do these relate to the initial aim of the enquiry?	Synthesise findings to draw conclusions based on evidence
6. Evaluation of the whole investigation – what evaluative techniques should be applied to the enquiry process?	Critically reflect on every stage of the whole investigation in order to appreciate the strengths and limitations of the primary and secondary data, links to original question; note strengths and limitations (accuracy, validity and reliability) and anomalies and / or errors or misuse of data; evaluate the methodology including, if relevant, sampling techniques; suggest improvements for further research

To prepare for each of their fieldwork activities, learners should be given opportunities to:

- pose geographical questions
- consider appropriate data collection methodologies
- design survey strategies before they go on field visits.

In considering appropriate primary data / information collection (raw data / information collected in the field), learners should be guided to note that data / information involves:

- taking measurements and surveys, including questionnaires, observations and interviews
- making images, including field sketches and photographs
- obtaining raw census material
- obtaining information from GIS.

Learners should also be guided towards sampling techniques, coding, timing and frequency as appropriate. Collecting secondary information should be included as appropriate. This is data that has already been processed in published materials. More details follow in Section 2.4 of this specification.

After their various fieldwork activities, learners should be given opportunities to:

- consider appropriate methods of data / information presentation
- reflect on their fieldwork findings by processing data
- analyse patterns and trends and draw conclusions
- evaluate techniques and the various fieldwork activities.

This exercise of reflecting on the fieldwork as a whole provides the preparation necessary for the completion of the final sections in the written independent investigation in Component 4.

Centres will be required to verify that the prescribed fieldwork has taken place.

See Section 3.3 for the verification arrangements for fieldwork.

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2.1 Component 1

Changing Landscapes and Changing Places
Written examination: 2 hours 15 minutes
30% of qualification
120 marks

This component covers the following core themes.

SECTION A – Changing Landscapes

In this section there is a choice between **either** coastal **or** glaciated landscapes.

1.1. Coastal Landscapes **or**
1.2 Glaciated Landscapes

SECTION B – Changing Places

This section is compulsory.

1.3 Changing Places – compulsory

The content for theme 1 or 2 and theme 3 must be treated with equal depth.

Scale in this component is fundamentally at the local level but includes a wider region to put the local level into context: it also emphasises linkages between local and regional and extends to national and international.

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SECTION A – Changing Landscapes

Either 1.1: Coastal Landscapes

This optional theme involves the study of coastal landscapes developed by the interaction of winds, waves and currents and the sediment supply from terrestrial and offshore sources. Study takes place within a systems framework, focusing on spatial and temporal variations in the geomorphological processes that operate within coastal landscapes and how the flows of energy and movement of materials combine to create specific landforms on rocky, sandy and estuarine coastlines. Scale in this theme is fundamentally at the local level but includes a wider region to put the local into context. Some content moves beyond the local to embrace a variety of landscapes not evident in the UK, for example the study of mangrove coastlines.

The impact of human activity as a factor causing change within coastal landscape systems will also be studied.

As an outcome of studying the content of this theme, learners will gain understanding of **specialised concepts**. These include causality (linking processes to landforms and landscapes), equilibrium (related to dynamic equilibrium), feedback (the process by which the coastal system responds to changing inputs and outputs), interdependence (the relationship between human activity and coastal landscape systems), mitigation (related to coastal management), adaptation (related to shoreline plans), risk (in the context of the impact of extreme weather events associated with anthropogenic climate change on coastal processes and landforms), resilience (related to coastal management), systems (especially coastal sediment budgets), and thresholds (a factor that complicates the self-regulation of the coastal system: when crossed, it sets irreversible changes in motion).

Focus	Geographical content
1.1.1 The operation of the coast as a system	• The coastal system including inputs, outputs, stores and transfers of energy and materials • Terrestrial and offshore supplies of sediment • Coastal sediment cells • Dynamic equilibrium in the coastal system and zone of rapid changes
1.1.2 Temporal variations and their influence on coastal environments	• Diurnal tides, offshore and onshore currents • Constructive and destructive wave types and their characteristics and seasonal variations
1.1.3 Landforms and landscape systems, their distinctive features and distribution	• High energy coastal environments and associated erosional landforms and landscape systems including rocky coastlines • Low energy coastal environments and associated depositional landforms and landscape systems including sandy coastlines and estuarine coastlines
1.1.4 Factors affecting coastal processes and landforms	• Fetch, wave type, wave orientation, wave refraction and reflection • Lithological factors of mineral composition, hardness and solubility of rocks • Structural geology including bedding, dip, joints, folding and faulting

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Focus	Geographical content
1.1.5 Processes of coastal weathering, mass movement, erosion and the characteristics and formation of associated landforms	• Sub aerial processes of weathering (physical, chemical and biotic) and mass movement including landslides, slumps and rock falls • Marine erosional processes of hydraulic action, abrasion (corrasion), corrosion and attrition • Characteristics of coastal landforms including cliffs, headlands and bays, cave-arch-stack-stump sequence and wave-cut platforms, geos and blowholes
1.1. 6 Processes of coastal transport and deposition and the characteristics and the formation of associated landforms	• Processes of coastal transport of solution, suspension, saltation and traction including longshore drift • Processes of coastal deposition result from reduced energy levels including flocculation and sediment sorting • Characteristics of coastal landforms including beaches, spits, bars, tombolos and cuspate forelands
1.1.7 Aeolian, fluvial and biotic processes, the characteristics and the formation of landforms in coastal environments	• Action of wind and associated landforms of sand dunes • Action of fluvial processes in estuarine environments and associated landforms of tidal flats, salt marshes and micro-features of channels and rills • Action of biotic processes and associated development of coral reefs and mangrove coastlines
1.1.8 Post-glacial modification of coastal landforms and landscapes	• Causes of sea-level change including eustatic and isostatic • Coastlines of submergence resulting from a relative (positive) sea-level rise including fjords, rias and Dalmatian coasts • Coastlines of emergence resulting from a relative (negative) sea-level fall including raised beaches, fossil cliffs and associated micro-features
1.1.9 The impact of human activity on coastal landscape systems	• Impact of tourism activities on coastal processes and landforms • Impact of offshore dredging on coastal processes and landforms • Impact of storm events associated with anthropogenic climate change on coastal processes and landforms
1.1.10 The management of the coastal system and its impact	• Integrated strategies and shoreline management plans • Hard coastal management strategies including groynes, rock armour, gabions, revetments, sea walls and cliff stabilisation • Soft coastal management strategies including beach nourishment, dune stabilisation and managed retreat

See Appendix B (Opportunities to develop geographical skills) for suggestions of skills that may be linked to study of this theme. Appendix A lists all the geographical skills that apply to this specification; while all must be addressed, greater coverage of quantitative skills will be appropriate to this theme.

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Or 1.2: Glaciated Landscapes

This optional theme involves the study of glaciated and formerly glaciated landscapes shaped by valley glaciers and ice sheets, bearing erosional and depositional imprints of the passage of glacier ice in a range of features. Study will take place within a systems framework, focusing on spatial and temporal variations in the geomorphological processes that operate within glaciated landscapes and how the flows of energy and movement of materials combine to create specific landforms. Scale in this theme is fundamentally at the local level but includes a wider region to put the local into context. Some content moves beyond the local to embrace a variety of landscapes not evident in the UK, for example the study of contemporary permafrost degradation.

The impact of human activity as a factor causing change within glaciated landscape systems will also be studied.

As an outcome of studying the content of this theme, learners will gain understanding of **specialised concepts**. These include: causality (landforms processes and landscapes), equilibrium (a condition of balance within the glacial system which, when established, perpetuates itself unless controlling conditions change markedly), feedback (within the glacial system), interdependence (the relationship between human activity and the glacial landscape system), risk (in the context of water supply), systems (especially the glacial mass balance system), and threshold (a factor that complicates the self-regulation of the glacial system: when crossed, it sets irreversible changes in motion).

Focus	Geographical content
1.2.1 The operation of a glacier as a system	• The glacial system including inputs, outputs, stores and transfers of energy and materials • Change in the inputs to and outputs from a glacier over short- and long-time scales • The glacial budget including glacier mass balance and equilibrium • Positive and negative feedback in the glacier system
1.2.2 Climate change and the glacier budget over different time scales	• Causes of climate change through the Quaternary Ice Age including glacials, interglacials and stadial periods and thresholds for change • Causes of changes in the glacier budget through historical time including the Little Ice Age • Seasonal changes and their impact on the glacier budget
1.2.3 Glacier movement	• Differences between cold- and warm-based glaciers, their locations and rates of movement • Glacier ice movement including internal deformation, basal sliding, sub-glacial bed deformation, surge conditions, compressional / extensional flow
1.2.4 The range of glacial environments and their distribution	• Types of ice mass at a range of scales including cirque glaciers, valley glaciers, highland ice field, piedmont glaciers and ice sheets and sea ice • Past distribution of valley glaciers and ice sheets during the Quaternary Ice Age • Present day distribution of ice masses including valley glaciers and ice sheets

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Focus	Geographical content
1.2.5 Processes of glacial weathering, erosion and the characteristics and the formation of associated landforms	• Freeze-thaw weathering • Erosional processes of abrasion, plucking and sub-glacial fluvial erosion • Factors affecting glacial erosion including basal thermal regime, ice velocity, ice thickness, bedrock permeability and jointing • Characteristics of macro-scale glacial erosional landforms including cirques, pyramidal peaks, arêtes, glacial troughs, ribbon lakes, hanging valleys and truncated spurs; meso-scale glacial landforms including roches moutonnees, crag and tail; micro-scale glacial landforms including striations
1.2.6 Processes of glacial and fluvioglacial transport and glacial and fluvioglacial deposition and the characteristics and the formation of associated landforms	• Processes of glacial and fluvioglacial transport including supraglacial, englacial and sub glacial transfers and their resultant sediment characteristics (size, shape and sorting) • Landforms of glacial deposition including types of till (ablation, lodgement and deformation) and types of moraine (terminal, recessional, lateral, medial and push) and drumlins • Processes of fluvioglacial transport and deposition lead to ice-contact features including eskers, kames, kame terraces and proglacial features including sandurs, varves, kettle holes and kettle lakes
1.2.7 Suites of landforms within glacial landscapes	• Variations in glacial landscapes between highland and lowland • Variations in glacial landscapes between ice sheets and valley glaciers
1.2.8 Periglacial processes and the formation of associated features	• Ground ice formation and associated features, including ice lenses, ice wedge polygons, patterned ground, pingos and thermokarst landscape • Frost weathering and mass movement can lead to features including nivation hollows, blockfields and scree slopes, pro-talus ramparts, solifluction terraces and head deposits • Periglacial action of water and wind and associated landforms of dry valleys (water) and loess plateaux (wind)
1.2.9 Post-glacial modification of glacial landforms and landscapes	• Modification of fossil features and vegetation by processes of subaerial weathering and mass movement • Reworking of glacial deposits, infilling of glacial lakes and creation of misfit streams by fluvial processes
1.2.10 The impact of human activity on glacial landscape systems	• Anthropogenic climate change and associated increase in glacial lake outburst floods (GLOFs) • Human activity in glaciated landscapes including extraction of sands and gravels and creation of reservoirs • Permafrost degradation through human activity

See Appendix B (Opportunities to develop geographical skills) for suggestions of skills that may be linked to study of this theme. Appendix A lists all the geographical skills that apply to this specification; while all must be addressed, greater coverage of quantitative skills will be appropriate to this theme.

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SECTION B – Changing Places

1.3: Changing Places

This compulsory theme focuses on place and its dynamic nature. While the UK is the most likely context for study, appropriate examples from alternative national contexts may be used, both for classwork and fieldwork. Places are dynamic because the population, society, and the economy upon which they depend and the environment in which they are situated are in a constant state of flux. The changing economic environment impacts on employment structure with consequent effects on the nature of the environment, the demography of the place and available opportunities for quality of life (social inequalities). As places change there is often a need for government and society to respond which may take the form of innovation and regeneration or reinvention. A driver of change is economic restructuring (politically or commercially driven), which has major impacts on society, culture, and the environment. Learners begin by studying their own place, which may be declining or expanding, and how it is represented, and then move on to set this in a wider regional context and wider connections to national and global places. Change is often viewed in different ways by different groups and players.

As an outcome of studying the content of this theme, learners will gain an understanding of **specialised concepts**. These include: adaptation (the ability to respond to changing events), identity (how people view changing places from different perspectives and experiences), inequality (social inequalities between people and places), interdependence (links between the economy and society), globalisation (impact of world development on nations, regions and localities), representation (the way in which places are presented by formal and informal agencies), sustainability (linked to rebranding), and thresholds (the tipping point for change within settlements).

Focus	Geographical content
1.3.1 Places and their characteristics	• Characteristics of a variety of places including neighbourhoods, regions, the rural-urban continuum, megacities and world cities • Representations of places through social, economic and demographic statistics; media including photographs, art and texts; architecture and landscape features; institutional advertising; personal / mental mapping • Representations of place change over time due to technological, economic, political and demographic factors
1.3.2 Changes over time in the economic character of places	• Economic change in places over time can lead to the structural changes in employment shown by the Clark Fisher Model • Temporal changes of the primary, secondary, tertiary and quaternary sectors in different places • Factors influencing economic restructuring including changing technology and lifestyles, government strategy and globalisation

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Focus	Geographical content
1.3.3 Economic and social changes in rural places	• Reasons for the decline in primary employment for traditional communities in rural areas • Diversification in the post-productive countryside, including new tourism, ageing population and counter-urbanisation • Managing rural change in diverse communities including issues of housing, transport and service provision, including Broadband provision
1.3.4 The deindustrialisation of urban places	• Influence of historical factors on the characteristics of urban places, including industry and trade • Negative and positive consequences of the loss of traditional industries including dereliction, unemployment (the cycle / spiral of deprivation), demographic and cultural changes, landscaping and lower pollution levels • Government intervention in deindustrialised areas including re-training, social and environmental policies
1.3.5 Recent changes in central urban places	• Causes and consequences of decline for some central urban places including out-of-town retailing, internet shopping and clone towns • Retailing, commercial and entertainment expansion in some central areas and their demographic and economic drivers • Gentrification and associated social changes in central urban places experiencing re-urbanisation
1.3.6 The service economy (tertiary) and its impact on places	• Factors promoting the growth of business / finance, tourism / leisure and other services including government initiatives, investment by foreign MNCs and rising affluence • Positive and negative impacts of tertiarisation on the characteristics of different places including the growth of the commuter lifestyle, landscape changes and transport developments
1.3.7 The knowledge economy (quaternary) and its impact on places	• Knowledge economy clusters including culture / creative industries, digital / IT companies, science and biotechnology • Locational factors encouraging cluster growth including proximity to universities, government support, planning regulations and infrastructure • Impacts of quaternary industry clusters on places including population profiles, local congestion, hi-tech re-imaging, international prestige and connectivity

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Focus	Geographical content
1.3.8 The rebranding process and players in urban places	• Re-imaging and regenerating urban economies and environments through sport / music stadia, cultural quarters, festivals, industrial heritage and flagship developments • Re-imaging and regenerating urban economies and environments through partnerships including governments (at varying scales), development agencies, private enterprise, lottery / charities and individuals • Values and perspectives of different groups about the identity of urban places; conflicts arising from change and the management of change
1.3.9 The rebranding process and players in rural places	• Re-imaging and regenerating rural economies and environments through recreation and rural heritage, film sets, food / music / literature festivals, farm shops and outdoor activities • Re-imaging and regenerating rural economies and environments through partnerships including governments (at varying scales), development agencies, private enterprise, lottery / charities, conservation / nature agencies and individuals • Values and perspectives of different groups about the identity of rural places; conflicts arising from change and the management of change
1.3.10 Urban and rural management challenges	• On-going social issues of depopulation and multiple deprivation in places where regeneration / rebranding are absent or have failed, and possible actions • On-going challenges of segregation and inequality in some urban places, factors which give rise to this, and possible actions • New challenges of managing change in some rural communities associated with counter-urbanisation and second home ownership, and possible actions

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See Appendix B (Opportunities to develop geographical skills) for suggestions of skills that may be linked to study of this theme. Appendix A lists all the geographical skills that apply to this specification; while all must be addressed, greater coverage of qualitative skills will be appropriate to this theme.

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2.2 Component 2

Global Systems and Global Governance
Written examination: 2 hours 15 minutes
30% of qualification
120 marks

This component covers the following core themes.

SECTION A – Global Systems

This section is compulsory.

2.1 Water and Carbon Cycles

SECTION B – Global Governance: Change and Challenges

This section is compulsory.

2.2 Global Governance: Change and Challenges

The content for Water and Carbon Cycles and for Global Governance: Change and Challenges must be treated with equal depth.

Scale is emphasised in this component through the role of national governance and how this operates at an international scale to contribute to the global commons, although there is, to reinforce the concepts, added depth through exemplification at the local scale.

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SECTION A – Global Systems

2.1: Water and Carbon Cycles

This compulsory theme is based on the physical processes which control the cycling of both water and carbon between land, oceans and the atmosphere. It takes place within a systems framework to emphasise the integrated nature of oceans, earth and atmosphere, so that learners can gain an understanding of the key role played by the carbon and water cycles in supporting life on Earth. Systems operate at a range of temporal scales (seconds to millions of years) and space (plant to global) scales.

As an outcome of studying the content of this theme, learners will gain understanding of **specialised concepts**. These include: causality (changes within the cycles), equilibrium (of the cycles), feedback (within the systems), interdependence (of the two cycles), systems (the water and carbon cycles), and thresholds (the tipping point for change within and between the cycles).

Focus	Geographical content
2.1.1 The global water cycle as a system	• Inputs, outputs, stores and flows in the water cycle • Distribution and size of major stores of water (land, ocean, atmosphere and cryosphere) • Characteristics and causes of change in size of stores over space and time including variations in cryosphere, sea-level change, soil and vegetation stores
2.1.2 Catchment hydrology – the drainage basin as a system	• Input: precipitation type, amount, duration and intensity • Flows: throughfall and stemflow, infiltration, overland (saturation and infiltration excess) flow, throughflow, percolation, groundwater flow and channel flow • Stores: interception store, vegetation store, surface store, soil moisture store, channel store, groundwater store • Outputs: evaporation, transpiration and channel discharge to oceans
2.1.3 Temporal variations in river discharge	• Characteristics of river regimes including simple and complex regimes • Factors influencing river regime characteristics including climate, season, geology, vegetation and land use • The components and shape of storm hydrographs • Climatic factors influencing storm hydrographs including precipitation type, amount, duration and intensity, temperature, evaporation, transpiration and antecedent conditions • River catchment characteristics influencing storm hydrographs including size and shape, drainage density, porosity and permeability of soils and rock types, slopes, vegetation and land use

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Focus	**Geographical content**
2.1.4 Precipitation and excess runoff within the water cycle	• Causes of air uplift, condensation and cloud formation including orographic, frontal and convection • Theories of precipitation formation including Collision and the Bergeron-Findeisen process • Causes of excess runoff generation including prolonged precipitation, intense storms, monsoon rainfall and snowmelt • Human causes of excess runoff generation including changing land use and river mismanagement
2.1.5 Deficit within the water cycle	• Meteorological causes, including seasonal variation or longer-term climate change • Human causes, including depleting aquifers and surface water resources by abstraction • Natural and artificial recharge of aquifers to address the deficit

2.1.6 The global carbon cycle	• Distribution and size of carbon stores in oceans, atmosphere and on land (terrestrial biosphere and rocks)
	• Carbon pathways:
	  • between land and atmosphere through the processes of photosynthesis, respiration, decomposition, fossil fuel combustion and carbon capture
	  • between ocean and atmosphere through the processes of absorption by biota, diffusion into and out of oceans
	  • between land and oceans through the processes of weathering, river transport, indirect movement via the water cycle and carbon sequestration in sediments (limestone, coal, oil)

2.1.7 Carbon stores in different biomes	• Size of carbon stores in the tropical rainforest and temperate grassland and factors influencing the size of these stores including temperature, precipitation and light • Changes in the size of carbon stores due to human activity including deforestation, afforestation and agricultural activity
2.1.8 Changing carbon stores in peatlands over time	• The accumulation of the carbon store through the process of peat formation • The reduction of the carbon store through peat extraction and drainage • The restoration of the carbon store through management of peatlands

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Focus	Geographical content
2.1.9 Links between the water and carbon cycles	• Causes of recent increases in the atmospheric carbon store • Relationship between recent increases in the atmospheric carbon store and the energy budget • Impacts of recent increases in the atmospheric carbon store on the water cycle and oceans, including: amount, type and patterns of precipitation, extreme weather, river discharge, sea level rise, acidification of the oceans • Links between the water and carbon cycles at the local scale
2.1.10 Feedback within and between the carbon and water cycles	• Positive and negative feedback loops, thresholds and equilibrium in natural systems • Consequences of change within and between the water and carbon cycles including cryosphere feedbacks, marine carbon feedbacks, terrestrial carbon feedbacks and methane feedbacks

See Appendix B (Opportunities to develop geographical skills) for suggestions of skills that may be linked to study of this theme. Appendix A lists all the geographical skills that apply to this specification; while all must be addressed, greater coverage of quantitative skills will be appropriate to this theme.

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SECTION B – Global Governance: Change and Challenges

2.2: Global Governance: Change and Challenges

This theme covers global change and challenges. The focus of 2.2.1 to 2.2.5 is processes and patterns of global migration, a global flow which has historically had a major impact on most countries. Technological developments have accelerated migration over time, giving rise to a shrinking world. This brings opportunities and challenges to different localities.

The focus on 2.2.6 to 2.2.10 is the global governance of the Earth's oceans. Global flows that cross oceans include container shipping, oil tankers, broadband networks and illegal movements of people and goods. The oceans also function as a global commons for waste. Over time, nations have recognised the strategic importance of oceans. Throughout this section, learners are encouraged to reflect on how connectivity has linked people, places and environments across the globe, involving movements of goods, people and ideas. While globalisation is sometimes characterised as a borderless world, in reality a growing number of national and international laws and conventions have been introduced. These laws and conventions aim to manage global systems and the consequences they bring to people, places and environments around the world, which are often tied to issues of power, justice and inequality. Systems operate at a range of temporal scales and space (local to global) scales.

As an outcome of studying the content in 2.2.1 to 2.2.5, learners will gain understanding of **specialised concepts**. These include: causality (drivers of global patterns of migration), globalisation (links between countries), risk (associated with refugees), and resilience (ability of neighbouring countries to cope with refugees).

2.2.1 – 2.2.5: Processes and Patterns of Global Migration

Focus	Geographical content
2.2.1 Globalisation, migration and a shrinking world	• Growth of global systems; connections and global flows of goods, people, technology and ideas • Classification, quantification and mapping of global patterns of migration • Factors creating a shrinking world for potential migrants including transport, communication and media representation
2.2.2 Causes of international economic migration	• Causes of international economic migration including the inequalities of global economic systems • Recent drivers of migration including the development of diaspora communities, colonial and Commonwealth links and legislation permitting freedom of movement, including the EU • Global attraction / pull of core destinations including strong and emerging economies and world cities
2.2.3 Consequences and management of international economic migration	• Economic, social, cultural and political consequences for (i) host and (ii) source countries including migrant remittances • Political responses to, and management of, the free movement of people • Impact of policies to manage migration by host and source countries

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Focus	Geographical content
2.2.4 Causes, consequences, and management of refugee movements	• Causes of international refugee movements and internal displacement of people (Internally Displaced People) • Consequences of movements on refugees and their destinations including neighbouring states and developed economies • Actions to tackle refugee crises including the work of UNHDR, national governments and NGOs
2.2.5 Causes, consequences, and management of rural-urban migration in developing countries	• Causes of rural to urban migration in developing countries associated with technological and economic change within global systems • Consequences of rural-urban migration in rural and urban areas • Management of urban growth through formal and informal means including top-down planning in developing megacities, and bottom-up urban community development

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2.2.6 to 2.2.10: Global Governance of the Earth's Oceans

As an outcome of studying the content in 2.2.6 to 2.2.10, learners will gain understanding of specialised concepts. These include: causality (instability in ocean environments), globalisation (links between countries), mitigation (attempts to manage the global commons), risk (to ocean environments), and sustainability (management of ocean environments).

Focus	Geographical content
2.2.6 Global governance of the Earth's oceans	• Agencies for global governance including UN and UNESCO, EU, G7/G8, G20, G77 and NATO and the laws governing access to and use of the Earth's oceans • Strategic value of military ocean dominance for major powers • Security issues affecting maritime trade including the governance of oil transit chokepoints, the Suez and Panama canals and piracy hotspots
2.2.7 Global flows of shipping and sea cables	• Changing trends, patterns, networks and regulation of shipping including containers and oil tankers • Growth of smuggling and people trafficking and international efforts to manage these flows • Growth of seafloor cable data networks including causes, trends, patterns and uses • Risks to seafloor cable data networks including those from tsunamis and undersea landslides, and international conventions to protect seafloor data cables
2.2.8 Sovereignty of ocean resources	• Distribution of major ocean resources including minerals and fossil fuels • Ownership of ocean floor resources including the establishment of territorial limits and sovereign rights • Geopolitical tensions including the contested ownership of islands and surrounding seabeds and attempts to establish ownership of Arctic Ocean resources
2.2.9 Managing marine environments	• Causes and consequences of over-exploitation of marine environments • Sustainable management of marine environments including local no-catch zones, regional quotas / limits and marine national parks / conservation zones
2.2.10 Managing ocean pollution	• Main sources of ocean pollution including terrestrial run-off, waste disposal and oil spillage • Causes and consequences of plastic garbage patches and eutrophic dead-zones, including the role of ocean currents • Strategies to manage marine waste at different scales including global conventions, EU rules, awareness-raising and local actions

See Appendix B (Opportunities to develop geographical skills) for suggestions of skills that may be linked to study of this theme. Appendix A lists all the geographical skills that apply to this specification; while all must be addressed, greater coverage of qualitative skills will be appropriate to this theme.

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2.3 Component 3

Contemporary Themes in Geography
Written examination: 2 hours
20% of qualification
80 marks

This component covers the following areas of study in contemporary themes.

SECTION A –Tectonic Hazards

This section is compulsory.

3.1 Tectonic Hazards

SECTION B – Contemporary Themes in Geography

This section is based on five optional themes. **Two** optional themes must be selected for study.

3.2 Ecosystems
3.3 Economic Growth and Challenge: India or China
3.4 Energy Challenges and Dilemmas
3.5 Weather and Climate
3.6 Development in an African Context

Scale in this component covers local to global as appropriate to the context.

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SECTION A – Tectonic Hazards

This section is based on one compulsory theme, Tectonic Hazards.

3.1: Tectonic Hazards

This compulsory theme is based on a study of the structure of the Earth and the processes operative within the asthenosphere and lithosphere. These processes and their distribution are closely related to tectonic activity at plate boundaries. Tectonic hazards include primary hazards of volcanic and seismic events and secondary hazards resulting from both. Tectonic hazards have various effects on people and operate at a range of spatial and temporal scales. Steps can be taken to prepare for, adapt to and respond to tectonic hazards by employing a variety of strategies. The vulnerability of people to tectonic hazards can lead to some events turning into disasters.

As an outcome of studying the content of this theme, learners will gain an understanding of **specialised concepts**. These include: inequality (linked to vulnerability and responses), interdependence (linked to aid), mitigation and adaptation (linked to responses to hazards), resilience (linked to strengthening strategies), risk (linked to vulnerability and turning hazards into disasters), and systems (with the cycle of tectonic renewal and take-up, for example, in the sea floor cycle).

Focus	Geographical content
3.1.1 Tectonic processes and hazards	• Characteristics of the Earth's structure including core, mantle and crust and the boundaries between them • Mechanisms of plate movement including internal heating within the Earth, convection currents, ridge push and slab pull • Plate distribution and the processes operating at different margins including diverging, converging and conservative margins; and tectonic activity at hot spots • Global distribution of tectonic hazards and their link to tectonic processes • Characteristics of the physical hazard profile that influence its impact including magnitude (as measured on Mercalli and Richter scales and Volcanic Explosivity Index), predictability, frequency, duration, speed of onset and areal extent
3.1.2 Volcanoes, processes, hazards and their impacts	• Types of volcano including shield, composite and cinder and types of volcanic eruption including explosive and effusive • Volcanic processes and the production of associated hazards including pyroclastic flows, lava flows, ash falls, lahars, jökulhlaups, volcanic landslides and toxic gases • Environmental, demographic, economic and social impacts of volcanic hazards on people and the built environment including primary and secondary effects • Local scale, regional scale and global scale impacts of volcanic activity • Use examples of at least **two** contrasting contexts to demonstrate the varied degree of risk and impacts of volcanic activity

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Focus	Geographical content
3.1.3 Earthquakes, processes, hazards and their impacts	• Earthquake characteristics to include P and S waves, focus, depth and epicentre • Earthquake processes and the production of associated hazards including ground shaking, liquefaction, landslides and tsunami • Environmental, demographic, economic and social impacts of earthquake activity on people and the built environment including primary and secondary effects • Local scale, regional scale and global scale impacts of earthquake activity • Use examples of at least **two** contrasting contexts to demonstrate the varied degree of risk and impacts of earthquake activity
3.1.4 Human factors affecting risk and vulnerability	• Economic factors including level of development and level of technology • Social factors including the population density, population profile (age, gender) and levels of education • Political factors including the quality of governance • Geographical factors including rural / urban location, time of day and degree of isolation
3.1.5 Responses to tectonic hazards	• Monitoring, predicting and warnings of volcanic eruptions and earthquakes and tsunami • Mitigating volcanic and earthquake hazards and modifying the event, vulnerability and loss • Short-term and long-term responses to the effects of earthquake and volcanic hazards (the hazard management cycle)

Appendix A lists all the geographical skills that apply to this specification.

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SECTION B – Contemporary Themes in Geography

This section is based on five optional themes. **Two** optional themes must be selected for study.

3.2 Ecosystems
3.3 Economic Growth and Challenge: India or China
3.4 Energy Challenges and Dilemmas
3.5 Weather and Climate
3.6 Development in an African Context

The optional themes have been designed to make links between physical and human geography and to focus on people-environment interactions. Learners should strive to develop in-depth knowledge, critical understanding and an overview of the concepts and issues underpinning the geographical content of the selected themes. Knowledge of relevant geographical terminology is important.

Each optional theme in this component has a choice of **two** questions in the assessment.

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3.2: Ecosystems

This optional theme addresses ecosystems. It has been argued that human well-being depends on the services provided by ecosystems (*from The UN Millennium Ecosystem Assessment*). It covers the processes that maintain or change ecosystems and the interactions between the component parts at a range of spatial and temporal scales. In this sense, people are viewed as drivers of change, as well as being at risk when the systems lose equilibrium. An understanding of the interdependence of the abiotic and biotic elements is critical. The Arctic tundra biome, excluding Alpine, is the selected case study because this ecosystem is often seen as most at risk due to climate change.

As an outcome of studying the content of this theme, learners will gain an understanding of **specialised concepts**. These include: adaptation (of biotic components), causality (linked to changes due to human activity), equilibrium and feedback (within ecosystems), mitigation and sustainability (linked to management and conservation), resilience (of native peoples), risk (from local, regional and global threats), systems (linked to their structure and functioning) and threshold (tipping points within ecosystems).

Focus	**Geographical content**
3.2.1 The value and distribution of ecosystems	• The value of ecosystems as providers of goods and services for the survival and well-being of humans including medicines, gene pools and resilience to hazards • Distribution of the major global biomes • Relationship between temperature / precipitation and the distribution of biomes including forests, grasslands and deserts
3.2.2 The structure and functioning of ecosystems	• The ecosystem concept including energy flows • Variations in nutrient cycling between two biomes to show the size of stores and rates of flow • Levels of primary productivity linked to the presence of limiting factors including temperature, moisture, light and nutrient availability
3.2.3 Biodiversity under threat	• Measures of biodiversity • Threats to biodiversity from direct action and indirect action operating at a range of scales from local to global • Ecosystems at greatest risk including tropical rainforests, coral reefs and wetlands
3.2.4 Conserving biodiversity	• Strategies to conserve biodiversity including a range from total protection through no access to sustainable use • Conservation issues including decisions on which habitats / species to conserve, and sources and types of funding
3.2.5 Ecosystems at a local scale	• Succession of one ecosystem • The arresting role of physical factors in creating sub-climax communities • Role of human factors in maintaining plagioclimax communities

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Focus	Geographical content
3.2.6 The Arctic tundra biome	• Characteristics of the climate, plants, animals and soils of the Arctic tundra biome • Interrelationships between the climate, plants, animals and soils of the Arctic tundra biome • Impacts of climate change on the Arctic tundra biome
3.2.7 Sustainable use of the Arctic tundra biome	• Threats to the Arctic tundra, including climate change, mineral exploitation and tourism • Conflicts with indigenous populations • Strategies used to manage the Arctic tundra biome

See Appendix B (Opportunities to develop geographical skills) for suggestions of skills that may be linked to study of this theme. Appendix A lists all the geographical skills that apply to this specification.

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3.3: Economic Growth and Challenge: either India <u>or</u> China

This optional theme addresses either India or China, two countries with increasing influence globally. It covers the study of the contemporary geography of either India or China and reasons for their emergence as a superpower. In order to understand their status, learners are encouraged to develop an understanding of the opportunities and constraints for economic development presented by India's or China's physical environment placed in the context of the demographic, social, cultural, economic and political changes occurring in each nation at a range of spatial and temporal scales. Threats to India's or China's sustainable development include environmental degradation, issues of water, energy and food security and growing inequalities. Further success for India's or China's growing economies and increasing global status is now dependent on achieving sustainable development with an improved balance between economic growth and environmental conservation.

As an outcome of studying the content of this theme, learners will gain an understanding of **specialised concepts**. These include, adaptation (in the context of a country and society undergoing rapid change), inequality (the consequences of economic and social change), globalisation (the changing position of India or China as a world power and its economic, social, technological and environmental links to the rest of the world), resilience (the ability of people and places to adapt to economic, social and environmental change), risk (the threats of economic growth to environment and traditional society), and sustainability (with respect to economic growth, society and the environment).

Focus	Geographical content: India	Geographical content: China
3.3.1 The physical background of India **<u>or</u>** China	• Relief and drainage patterns • Characteristics and patterns of climate • Water availability	• Relief and drainage patterns • Characteristics and patterns of climate • Water availability
3.3.2 The demographic, social and cultural characteristics of India **<u>or</u>** China	• Factors affecting population distribution, growth and structure • Political systems and governance influencing social change including health, education and welfare • Cultural influences including attitudes to gender, the caste system in India	• Factors affecting population distribution, growth and structure • Political systems and governance influencing social change including health, education and welfare • Cultural influences including attitudes to gender, minority groups in China

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Focus	Geographical content: India	Geographical content: China
3.3.3 Opportunities and constraints of India **or** China's physical environment	• Opportunities and constraints for economic development presented by the resource base including energy sources and minerals • Opportunities and constraints for economic development presented by the physical environment including relief, climate and water availability • Constraining effects of climate variability on human activity including droughts and floods	• Opportunities and constraints for economic development presented by the resource base including energy sources and minerals • Opportunities and constraints for economic development presented by the physical environment including relief, climate and water availability • Constraining effects of climate variability on human activity including droughts and floods
3.3.4 The economic and political background of India **or** China	• Distribution of economic activity • Influence of political systems of democracy in India on economic change • Role of government in the location and development of economic activity	• Distribution of economic activity • Influence of political systems of modified communism in China on economic change • Role of government in the location and development of economic activity
3.3.5 The global importance of India **or** China	• Recent changes in the size and structure of India's economy • The global shift, outsourcing and offshoring including the role of India as the global outsourcing capita • Influence of India's use of political (soft) power in the wider world including its participation in global organisations, governance, conventions and treaties	• Recent changes in the size and structure of China's economy • The global shift, outsourcing and offshoring including the role of China as the workshop of the world • Influence of China's use of political (soft) power in the wider world including its participation in global organisations, governance, conventions and treaties
3.3.6 Threats to India's **or** China's environment associated with economic growth	• Environmental pressures associated with economic growth including fossil fuel use, industrial pollution, soil erosion, deforestation and desertification • Environmental issues of water security, food security and energy security • Environmental pressures associated with rapid urbanisation	• Environmental pressures associated with economic growth including fossil fuel use, industrial pollution, soil erosion, deforestation and desertification • Environmental issues of water security, food security and energy security • Environmental pressures associated with rapid urbanisation

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Focus	**Geographical content: India**	**Geographical content: China**
3.3.7 Sustainable development in India **or** China	• Strategies to manage **one** environmental problem associated with economic growth • Strategies to improve the security of either water **or** food **or** energy • Strategies to improve the sustainability of urban communities	• Strategies to manage **one** environmental problem associated with economic growth • Strategies to improve the security of either water **or** food **or** energy • Strategies to improve the sustainability of urban communities

See Appendix B (Opportunities to develop geographical skills) for suggestions of skills that may be linked to study of this theme. Appendix A lists all the geographical skills that apply to this specification.

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3.4: Energy Challenges and Dilemmas

This optional theme covers the classification and distribution of energy resources and the physical factors determining their supply. Reasons for the growing demand for energy are explored, together with the issues associated with the management of energy supplies. Factors influencing a country's energy mix are examined, including the link with development. The traditional energy sources used in developing countries pose challenges which are being addressed through appropriate technology. Attempts to provide sustainable solutions require co-operation between governments, energy providers and individuals working together to implement international, national and local strategies. The objective is to provide clean, green energy supplies at affordable costs that are socially equitable.

As an outcome of studying the content of this theme, learners will gain understanding of **specialised concepts**. These include adaptation (the shift to appropriate technology), causality (of physical factors determining energy supplies), inequality (due to unequal access to energy supplies), interdependence and globalisation (in the form of agreements between OPEC countries), mitigation (through new technologies of carbon capture and sequestration), risk (the problems associated with energy supplies), and sustainability (clean, alternative energy sources).

Focus	**Geographical content**
3.4.1 The classification and distribution of energy resources	• Classification of energy resources • Global distribution of fossil fuel stocks and reserves • Alternatives to conventional fossil fuel sources
3.4.2 Physical factors determining the supply of energy	• Geological factors including physical reserves of fossil fuels and active areas for geothermal energy • Climatic factors including insolation rates and wind strength and reliability • Relief factors including suitable locations for dam construction and hydropower • Locations with favourable conditions for sustainable energy generation from waves, tides and biofuels
3.4.3 The changing demand for energy	• Changing global patterns of energy demand • Economic factors influencing the demand for energy • Demographic and social factors influencing the demand for energy • Technological factors influencing the demand for energy
3.4.4 The global management of oil and gas	• Managing the imbalance between the supply of and demand for oil and gas through transfers, storage and pricing • Management of oil and gas exploration and production by MNCs and national governments • Management of oil supplies by OPEC and national governments

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Focus	Geographical content
3.4.5 Problems associated with extraction, transport and use of energy	• Environmental problems associated with fossil fuels and other forms of energy • Political problems associated with fossil fuels and other forms of energy • Technological problems associated with fossil fuels and other forms of energy • Economic problems associated with fossil fuels and other forms of energy
3.4.6 Energy mixes and development	• At a local scale, the use of appropriate technology for sustainable energy micro-generation in developing countries • At a national scale, factors influencing the energy mix of countries at different stages of development • At the global scale, economic and political factors affecting world energy prices and energy mix
3.4.7 The need for sustainable solutions to meet the demand for energy	• Policies for demand reduction and increased energy efficiency at the global, national and local scale • Clean technologies for fossil fuels including carbon capture, carbon sequestration and gasification and transport technologies • Sustainability of alternative energy sources

See Appendix B (Opportunities to develop geographical skills) for suggestions of skills that may be linked to study of this theme. Appendix A lists all the geographical skills that apply to this specification.

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3.5: Weather and Climate

This optional theme begins with a global perspective on how the world's atmospheric systems lead to a variety of distinctive climatic types. It then focuses on the UK to explore how contrasting air masses and variable weather systems lead to one of the most changeable climates in the world. The contrasting weather systems can lead to the occurrence of weather and climate hazards, with some areas more at risk than others, or showing less resilience and more vulnerability to their impacts. Strategies of mitigation and adaptation are used to manage these weather and climate hazards, which show a rising trend as a result of short-term climate changes leading to more extremes of weather. With increasing urbanisation many areas now have distinctive urban climates in terms of weather and atmospheric quality. Globally, the challenges of climate change and the possibility of reaching a tipping point in terms of global warming provide challenges for the world to manage.

As an outcome of studying the content of this theme, learners will gain an understanding of **specialised concepts**. These include causality (linking atmospheric processes to the characteristics and function of climate types), interdependence (the interdependence of factors that may lead to future climate and weather), mitigation and adaptation (in the context of managing atmospheric hazards), resilience (the ability of humans to resist the threats posed by atmospheric hazards and the ability of atmospheric systems to respond to a disturbance or adapt to climate change), risk (in the context of living in areas that experience atmospheric hazards), systems (linked to pressure systems and circulation) and threshold (the tipping points associated with human impact on the atmospheric system).

Focus	Geographical content
3.5.1 Global controls on climate	• Structure of the atmosphere including the characteristics of different layers and their role in climate regulation and the atmospheric heat budget • Processes of global atmospheric circulation including the tricellular model • Distribution of the world's high and low pressure belts and their impact on planetary surface winds; oceanic circulation and its impact on climate; the regional impacts of continentality and altitude on climate
3.5.2 World's major climate types	• Major climatic types and their distinctive characteristics including temperature, precipitation, winds and pressure • Seasonal variations in the position of the ITCZ including migrations of the heat equator, wind and pressure belts • Monsoon climate including seasonal changes of precipitation, temperature, winds and atmospheric pressure
3.5.3 Climate and weather of the UK	• Characteristics of the UK's climate • Sources and characteristics of air masses and their influence on the UK's weather • Impacts of variations in the position, pattern and amplitude of the jet stream on the UK's weather
3.5.4 Extreme weather events	• Causes and consequences of recent and cyclic climate change including extreme weather events • Changing vulnerability of populations to weather and climatic hazards including exposure to climatic variability, sensitivity to stress and adaptive capacity

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Focus	Geographical content
3.5.5 Impacts and management of climatic hazards	• Impacts of hazards associated with low-pressure systems on the environment and human activity • Impacts of hazards associated with high-pressure systems on the environment and human activity • Strategies to manage climatic hazards
3.5.6 Impacts of human activities on the atmosphere at local and regional scales	• Impacts of urban areas on temperature, wind, precipitation and humidity • Impacts of urban areas on air quality including particulate pollution, photochemical smog and acid rain • Strategies to reduce the impact of human activity on urban climates and air quality
3.5.7 People, climate and the future	• Global impact of anthropogenic climate change on shifting climate belts • Consequences of reaching atmospheric tipping point including environmental and economic impacts • Strategies to mitigate and adapt to climate change at a variety of scales

See Appendix B (Opportunities to develop geographical skills) for suggestions of skills that may be linked to study of this theme. Appendix A lists all the geographical skills that apply to this specification.

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3.6: Development in an African Context

This optional theme covers the theme of development within a region of Africa, based on the Sahel. Development can be defined and measured in a variety of ways and there are variations in development both between and within countries. Development is influenced by a complex interplay of a variety of physical, economic, political, social and cultural factors that can operate to both promote and hinder the development process. The interplay and operation of these factors in the development process should be studied in the context of **two or more** countries, listed below, which are positioned towards the lower end of the development spectrum. The process of development often results in negative environmental impacts, including desertification, which constitutes a major challenge for all of the countries of the Sahel. Strategies designed to manage and promote environmental, economic and social development are critical to avert the repeated humanitarian crises that characterise these countries.

As an outcome of studying the content of this theme, learners will gain an understanding of **specialised concepts**. These include: sustainability (with respect to economic growth, society and the environment), globalisation and interdependence (the links between Sahelian countries and the rest of the world), risk (the threats of climate change, desertification and political instability), resilience (the ability of people and places to adapt to economic, social and environmental change), adaptation (in the context of a country and society undergoing rapid change), inequality (the consequences of economic, social and environmental change at regional and global scales).

Choose **two or more** of the following countries, which are located within the region, linked wholly or partly with the Sahel, to exemplify the geographical content: Benin, Burkino Faso, Chad, Eritrea, Ethiopia, Ghana, Mali, Mauritania, Nigeria, Niger, Senegal, Somalia, Sudan, South Sudan and Togo.

Focus	**Geographical content**
3.6.1 Definitions, measures and patterns of development	• Changing definitions of development • Measuring development including simple and composite quantitative measures and qualitative measures • The development gap and development continuum • Variation within countries including regional, ethnic and gender differences
3.6.2 The influence of physical factors on the development two or more countries	• The influence of resource base of minerals and energy sources on development • The influence of soils, relief, climate and water availability on development • The constraining effects of climate variability, droughts and / or floods on development
3.6.3 The influence of economic factors on the development two or more countries	• Influence of free trade and trade blocs in promoting and hindering development including subsidies and tariffs, quotas and protectionism • The resource curse and conflict, including the issue of conflict minerals • Influence of MNCs, including foreign direct investment, out-sourcing and offshoring • Influence of tourism and fair trade

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Focus	Geographical content
3.6.4 The influence of political, social and cultural factors on the development two or more countries	• Influence of political factors including governance, colonialism and neo-colonialism, global organisations and corruption. Influence of social factors including education, health and welfare, social and cultural constraints including the role of women and ethnic divisions
3.6.5 The impact of development on the environment of two or more countries	• Effects of economic development on consumerism and the environmental impact of the exploitation of natural resources • Environmental impacts of agro-industrialisation • Impact of manufacturing and extractive industries on the environment
3.6.6 Challenges of desertification in two or more countries	• Causes of desertification • Consequences of desertification • Strategies to address the causes and consequences of desertification
3.6.7 Strategies to promote development in two or more countries	• Role of national governments • Role of international aid agencies, NGOs and micro-finance schemes • Role of the World Bank and IMF

See Appendix B (Opportunities to develop geographical skills) for suggestions of skills that may be linked to study of this theme. Appendix A lists all the geographical skills that apply to this specification.

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2.4 Component 4

Independent Investigation
Non-exam assessment
20% of qualification
80 marks

This component builds on the applied fieldwork developed throughout the specification and the requirements to relate fieldwork to knowledge and understanding of the six stages of the enquiry process. In relation to this component, the fieldwork opportunities enable learners to carry out primary data collection and this primary data can form the basis of some of the data needed for the independent investigation. Alternatively, learners can collect further primary data, if this suits their chosen research question for the independent investigation. As part of the preparation for fieldwork and to enable the particular independent investigation to take place, teachers need to guide learners towards appropriate research areas, types of research questions and types of data collection, presentation and analytical techniques.

Once these steps have taken place and learners have defined their research area, they can move on to defining their title.

The independent investigation must be based on a question or issue defined and developed by the learner individually to address aims, questions, and / or hypotheses, and must relate to the specification content. Learners must support their research area through further background material using secondary data and an appropriate selection and presentation of primary data, incorporating appropriate geographical skills.

Further, learners must independently contextualise, analyse and summarise their findings and data, draw conclusions and evaluate their whole investigation. As part of the reflection, learners should also make links and connections between their own research, the real world and geographical theory.

The whole body of work should be communicated by means of extended, well-structured writing and the presentation of relevant data.

Some stages of the fieldwork can include group work, such as data collection, and this can be used as the basis for the learner's own independent investigation. Where there is group collection of data, learners must describe their role in this process and indicate data that is common material. However, the research question must show thorough, individual research and the interpretation, analysis and evaluation must be the **learner's own**, which is reflected in the weighting in assessment mark bands. The most able learners will show depth and some individuality in and critical reflection of their investigation.

The required structure for the written independent investigation follows. This is framed by the six stages of the enquiry process.

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The structure of the written independent investigation

The writing of the investigation must be structured under the following headings, which are assessed and include the six stages of enquiry. The assessment objectives (AOs) listed refer to those that apply to each section.

Section	Contents	AO
Abstract of up to 250 words	Synopsis of the investigation	
1. Introduction	Research question or issue; conceptual framework, including theoretical background; risk assessment and ethical issues (Location stated to give context)	AO3.1 AO1
2. Methods of investigation	Description and justification of methods used to observe, measure and record phenomena in the field including sampling strategies applied to the data collection methods; description of role undertaken in data collection (individual and / or group)	AO3.1 AO3.2
3. Data presentation with a range of techniques	Communicating primary and secondary data / information collected through appropriate presentation techniques (for example, using quantitative and qualitative skills, such as numerical tables, graphical and cartographical material, digital material and observations, for example with field sketches and annotated photographs)	AO3.3
4. Analysis and interpretation of findings	Analysis, interpretation and evaluation of findings – data / information collected; data presentation techniques; justification of location used	AO3.2
5. Conclusions	Drawing well-evidenced conclusions, synthesising findings, and informed by theoretical background underpinning the research given in the introduction	AO3.3
6. Evaluation	A succinct, critical reflection of every stage of the whole investigation in order to appreciate the strengths and limitations of the primary and secondary data, accuracy, degree of reliability and / or errors or misuse of data, bias, appreciate views and interests of stakeholders, methods used, findings and conclusions drawn; suggestions for further improvements and / or further research	AO2.1c
Presentation requirements; references, appendices, structure	Bibliography of secondary information and relevant appendices included. Guidance on references, the word count and appendices can be found in Section 3.2 on page 42	AO3.3

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Collecting data / information

In collecting raw data (primary data) in the field, through measurements and observations, learners should have an **adequate amount** of primary data collected to allow them **to analyse** their findings required in section 4. Details in Section 2a of this specification give further information on primary data collection, including sampling techniques.

Using geographical skills

Learners should demonstrate a range of quantitative and qualitative skills specific to data / information collection. Appendix A lists skills which relate to examination requirements, but learners may also use other relevant techniques and statistical techniques. These techniques could include Mann Whitney U Test, Pearson's Product Moment, and Simpson's diversity correlation.

Learners may use any of these quantitative and qualitative skills as appropriate to their investigation. For example, quantitative techniques might include measurements of flow, scale, spatial pattern and temporal change. Qualitative techniques might include use of questionnaire, bi-polar techniques and annotation of photographs / sketches.

Some secondary information must also be included in the independent investigations; for example, from background reading, satellite images, aerial and oblique photographs, large databases and GIS. Secondary information is data that has already been processed in written and cartographic form in published materials, such as text books, journals and online articles and includes material from:

- government materials
- media
- charities, NGOs, civil society organisations and pressure groups
- meteorological, environmental and conservation organisations
- geographical publications including text books and journals
- maps and charts.

Learners should be aware of possible bias in secondary data.

Time allocation

The non-exam assessment is integral to A level Geography and contributes 20% to the overall final assessment. Time is not prescribed for this work because the process of fieldwork, research and writing is iterative. However, teachers should make time available for the following:

- to explain the requirements of the independent research and written report
- to guide learners to appropriate areas of research
- to direct learners to the assessment objectives relevant to assessment for this component
- to revisit the six stages of the enquiry process
- to analyse health and safety considerations, risk assessment and ethical issues associated with data collection in the field
- to integrate understanding of geographical skills.

As a consequence, the overall time given to this independent investigation both by the teacher and learners should be commensurate with the **20% weighting** for this component**.**

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3 ASSESSMENT

3.1 Assessment objectives and weightings

Below are the assessment objectives for this specification. Learners must:

AO1
Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change, at a variety of scales

AO2
Apply knowledge and understanding in different contexts to interpret, analyse and evaluate geographical information and issues

AO3
Use a variety of relevant quantitative, qualitative and fieldwork skills to:

- investigate geographical questions and issues
- interpret, analyse and evaluate data and evidence
- construct arguments and draw conclusions

The table below shows the weighting of each assessment objective for each component and for the qualification as a whole.

	AO1	AO2	AO3	Total
Component 1	11%	12%	7%	30%
Component 2	14%	10%	6%	30%
Component 3	10%	10%	0%	20%
Component 4	2.5%	5%	12.5%	20%
Overall weighting	**37.5%**	**37%**	**25.5%**	**100%**

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3.2 Arrangements for non-exam assessment

This specification will be updated once the arrangements for non-exam assessment have been finalised. The following statement has been agreed by all awarding organisations.

The A Level non-exam assessment comprises an Independent Investigation. It is a compulsory requirement of the course of study and accounts for 20% of the qualification grade.

Awarding organisations are working together to agree common principles for the guidance and arrangements for task setting, task taking, and the declarations required to show that work is authentic and meets specification requirements.

The final requirements for non-exam assessment will be consistent across all awarding organisations. The accredited specifications will be updated in autumn 2015 to include this information.

Further details on arrangements for non-exam assessment are provided by the Joint Council for Qualifications (JCQ). Please refer to the JCQ website, www.jcq.org.uk, for further information.

Preparation for the independent investigation

For learners to display the skills necessary for attainment at the highest levels, centres must guide learners towards appropriate research areas and establish the fieldwork enquiry process, in preparation for the independent investigation in Component 4. This fieldwork can be linked to study in Component 1 of either a coastal or a glaciated landscape and changing places at the local level in the first instance. These can account for two of at least four days of fieldwork and on these occasions learners can begin to develop their understanding of the six stages in the enquiry process. From these initial two days linked to Component 1, learners can progress to develop a greater understanding of the enquiry process in further fieldwork activities. In total this will enable centres to reach the overall required total of the equivalent of at least four days of fieldwork. Centres can, if they wish, develop further fieldwork beyond this requirement. The required four or more days for fieldwork must involve out-of-classroom activity; these days must not be used for writing up the investigations.

Overall, from these days of fieldwork, learners should develop an understanding of the six stages of the enquiry process that will enable them to undertake research for, and completion of, their own independent investigation for Component 4. Learners must also be made aware of the requirements and assessment objectives. Section 2a details the fieldwork enquiry process and Section 2.4 gives full details of the independent investigation required in Component 4.

The centre must not only guide learners to appropriate areas of research but must approve the research by checking the learners' proposals during the first stages of their investigation to ensure that they are appropriate for investigation. Centres must also ensure they guide learners as they develop their investigation to ensure it arises from the specification. Details about approval of the learners' investigation by centres and related guidance will be available on the Geography home page on the public website.

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Word count

Learners are expected to follow the advisory guidelines on the length of the written report, which is 3000 to 4000 words. This includes all the text, text boxes, and supplementary material such as photographs and data presentation techniques. It does not include appendices. It is helpful when attaching appendices that these contain examples of raw data only, such as data sheets and questionnaires, rather than every questionnaire used.

Learners who offer work that is too short will be penalising themselves by not allowing appropriate coverage of the required assessment objectives. Learners who exceed the advisory word count will be penalising themselves through a lack of precision and focus.

References

References to all secondary information used in the written independent investigation must be acknowledged. This can be through an appended bibliography using a conventional in-text referencing system, such as the Harvard system, or through footnotes, although footnotes should be used to refer to the text. The Harvard system of referencing includes the use of title, author and date for publication. All sources and digital material taken from the internet must also be referenced with titles and URL addresses or screen shots.

Format for the written independent investigation

The report **must:**

- be word processed in Arial, Calibri or Times New Roman
- be font size 11 point
- have text set out in 1.5 spacing
- have all pages numbered
- have candidate number and centre number in either the header of footer on all pages
- have headings and labels for such items as photographs, tables and maps, with scales and keys / legends on maps.

Review of progress and drafting

Guidance and review of progress must be given by teachers and follow these requirements. Guidance should be offered in two stages:

1. At the planning stage, stage 1 of the enquiry approach when learners are drafting their research questions and considering their data collection, presentation and analytical techniques. Checks must also be made to ensure that these elements are appropriate and linked to the specification. Details about this guidance and approval will be available on the Geography home page on the public website.

2. After the first drafting of the written investigation before the final report is handed in. Advice must be generic, that is, teachers can give suggestions on areas where improvements could be made but should not indicate how. Further, feedback must not involve editing the work; for example, indicating errors, omissions, structure and ways to improve the presentation. The learner must decide independently what must be improved and how.

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Authentication

It is important that non-exam assessments are rigorously monitored by centres to ensure that learners' work is their own. Centres should monitor learners' work by:

- keeping a careful record of the review of progress, particularly in the submission of the draft of the written independent investigation
- carefully considering whether the work submitted is characteristic of the candidate's ability / attainment
- keeping work secure once the final written investigation is handed in. It must not be returned to the learner to make changes and must be kept securely in the centre.

All learners are required to sign a statement endorsing the originality of their written independent investigation and centres must countersign that they have taken all reasonable steps to validate this and countersign the statement. An **authentic** teacher's signature must be used; a scanned or electronic signature will **not** be accepted. The form **must** be counter signed by a senior member of staff.

The authentication statement and required signatures are included in the **non-exam assessment coversheet,** which must be completed for **all learners**, not just those selected for the sample to be sent to the moderator. The forms can be downloaded from the Geography homepage on the public website.

Plagiarism

Centres are required to be vigilant and refuse to award marks or submit for moderation any work that they consider to be not the learner's own. Learners will be penalised for any attempt to plagiarise. General advice and guidance on how to proceed if plagiarism is suspected can be found on the JCQ website.

Assessment grids and teacher annotations

When assessing the written reports teachers should study the non-exam assessment mark bands in Appendix C, which are designed to present a system that links the assessment objectives to marks, and to discriminate clearly between the varying levels of achievement.

Teachers must make specific reference to the assessment objectives in the annotations that they write on the work and on the marking grid included with the **non-exam assessment coversheet.** Teachers are required to record separate marks for each assessment objective in the spaces provided on the marking grid, to total the overall mark in the box provided and to make an **overall** summative comment about the work. Teacher annotations on the body text of the written investigation are also very useful to show how and why the marks have been awarded. All annotations and marks must be made in ink.

The assessment grids will be of most value when used in conjunction with examples of non-exam assessment, which will be issued by WJEC to help centres identify the quality of the work associated with various mark bands. Details about the examples will be found on the Geography homepage on the public website.

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Submission of marks and administration

Centres need to submit marks for non-exam assessed work online **in March** of the year when the work is to be submitted for moderation. When the marks have been submitted to WJEC, the online system will identify the sample of learners whose work is selected for moderation.

- Only the learners **selected for the sample** should be sent to the moderator **in rank order**.
- Each selected candidate's non-exam assessment report must be accompanied by a **non-exam assessment coversheet** on which the candidate must supply the title of their independent investigation, the link to the specification, and the teacher's overall comment for the moderator, together with the marking grid.
- **The authentication statement on the non-exam assessment coversheet must be signed by both the candidate and the teacher**.
- The pages of the written report must be held together securely. The study should **not** be placed in any form of plastic folder or ring binder.
- Details about the learners' proposals will follow.

N.B. Please remember that **all** learners' work, not just the sample, must be authenticated internally by signing a coversheet.
The moderation sample of learners' work should be sent to the external moderator by an agreed date in March in the final spring term of the A level course.

- Details of the submission of samples will be available on the Geography homepage on the public website.
- All centres will receive detailed feedback from the moderation process in the form of reports to centres.
- Examples of independent investigations will be available on the secure website.

Internal standardisation and moderation

Where there is more than one teacher in a centre, work from all teaching groups must be standardised internally. This is designed to ensure that the final assessment reflects a single agreed standard for all teaching groups involved. Standardising material will be issued by WJEC to assist with this process.

For moderation to take place and to be standardised fairly, each centre is assigned an external moderator by WJEC. It is essential that the moderator understands the nature of the independent investigation submitted and the way that criteria have been used to make a final assessment. The required details on the non-exam assessment coversheet and the annotations made on the body of the text are therefore very important.

Please refer to details on the JCQ website for further arrangements on non-exam assessment.

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3.3 Arrangements for fieldwork

Each centre must provide a **Fieldwork Declaration** to WJEC, which details that the four days of fieldwork, including a focus on both physical and human geography, have been carried out by the centre in each assessment cycle. Failure to provide a fieldwork declaration will be treated as malpractice and / or maladministration.

Centres will be able to make their **Fieldwork Declaration** by completing a form that will be available to download from the Geography homepage on the public website. Centres will be able to use the form to confirm that each learner has been provided with opportunities to undertake geographical fieldwork on four occasions and with respect to two physical and two human geography themes.

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4 TECHNICAL INFORMATION

4.1 Making entries

This is a linear qualification in which all assessments must be taken at the end of the course. Assessment opportunities will be available in the summer series each year, until the end of the life of this specification. Summer 2018 will be the first assessment opportunity.

Where learners wish to re-sit the qualification, all components must be re-taken.

The entry code appears below.

WJEC Eduqas A level Geography: A110QSL

The current edition of our *Entry Procedures and Coding Information* gives up-to-date entry procedures.

4.2 Grading, awarding and reporting

A level qualifications are reported as a grade from A* to E. Results not attaining the minimum standard for the award will be reported as U (unclassified).

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APPENDIX A
Geographical skills

Geographical skills in relation to both **quantitative and qualitative skills** are required for A level learners and the following list indicates those selected for study for all components in this specification. All the skills need to be addressed within these components but not all will apply to fieldwork. The four required days of fieldwork should contribute to learners building a holistic understanding of quantitative and qualitative skills related to fieldwork and the six-stage enquiry process.

Geographical skills

In relation to both, as appropriate, learners must be able to:

- understand the nature and use of different types of geographical information
- collect such information including primary and secondary data / information and are defined in Component 4, section 2.4, in collecting data / information and using geographical skills
- process such information, including as relevant, classification and representation
- analyse, interpret and evaluate such information, including bias, errors, misuse and anomalies
- understand the ethical and socio-political implications of collecting, studying and representing geographical data about human communities
- draw well-evidenced conclusions informed by wider theory
- construct extended written arguments.

Quantitative skills to collect data through numerical measurements.	Ref. No.
1. Cartographical information:	
• longitude and latitude	1.1
• map coordinates including grid references and area references	1.2
• distance and area	1.3
• direction	1.4
• scale	1.5
2. Number and statistical calculations:	
• sampling, including random, stratified, systematic	2.1
• totals	2.2
• percentages	2.3
• fractions, proportions and ratios	2.4
• data sets (small to large)	2.5
• frequencies	2.6
• densities	2.7
• scales of measurement	2.8
• measures of central tendency (mean, median, mode)	2.9
• measures of dispersion (range, standard deviation, inter-quartile range)	2.10
• measurements of concentration, including nearest neighbour and location quotient	2.11
• ratios including dependency ratio and Gini-coefficient	2.12
• indices including ecological footprint, HDI	2.13
• measures of correlation, including a scatter plot, lines of best fit and Spearman Rank	2.14
• inferential statistics, including Chi-square	2.15

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3. Cartographic and graphical material:	
• isoline and isopleth maps	3.1
• choropleth maps	3.2
• dot maps	3.3
• flow diagrams and maps	3.4
• proportional symbols	3.5
• graphs, including scatter, line, bar, triangular, logarithmic, bipolar	3.6
• pie charts	3.7
• population pyramids	3.8
• cross-sections and long profiles	3.9
• rose / star / radial diagrams	3.10
• kite diagrams	3.11
• Lorenz curve	3.12
4. Digital and geo-located data:	
• geospatial technologies including aerial photographs, digital images, satellite images, geographic information systems (GIS), global positioning systems (GPS), databases	4.1
Qualitative skills to collect data through non-numerical techniques	
5. Cartographical information for:	
• landscape system identification	5.1
• land-use identification	5.2
• risk assessment	5.3
6. Cartographic and graphical material:	
• mental maps	6.1
• GOAD plans	6.2
• Ordnance Survey maps (1:25 000 and 1:50 000)	6.3
7. Digital and geo-located data:	
• geospatial technologies including aerial photographs, digital images, satellite images, geographic information systems (GIS), global positioning systems (GPS), databases	7.1
• field sketches	7.2
8. Textual and visual sources:	
• interview material	8.1
• images	8.2
• factual text	8.3
• discursive / creative material	8.4
• oral histories	8.5

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APPENDIX B

Opportunities to develop geographical skills

The following list indicates a selection of opportunities within this specification to use and apply geographical skills in relation to both quantitative and qualitative skills.

The geographical skills (from Appendix A) are listed in the left column and the opportunities within Components 1 and 2 are listed in the right hand column, using focus numbers from the relevant theme, for example 2.2.8 Sovereignty of ocean resources, in Theme 2.2 Global Change and Challenges.

Quantitative skills	Focus
Cartographical information:	
• longitude and latitude	(2.2.8) (3.6.2) (3.2.1)
• map coordinates including grid references and area references	(opportunities throughout)
• distance and area	(1.2.4 area) (1.3.7) (3.2.5)
• direction	(opportunities throughout)
• scale	(opportunities throughout)
Number and statistical calculations:	
• estimate	(1.1.2)
• totals	(1.3.6) (3.5.7)
• percentages	(1.3.6) (1.3.8)
• fractions, proportions and ratios	(1.3.2)
• data sets (small to large) including crowdsourced	used in every unit
• frequencies	(1.1.6) (1.2.8)
• densities	(1.3.8)
• measures of central tendency (mean, median, mode)	(1.2.3 mean) (1.3.2)
• measures of dispersion (range, standard deviation, inter-quartile range)	(1.1.6) (1.2.8) (3.6.1)
• measurements of concentration, including nearest neighbour and location quotient	(1.3.4 location quotient) (1.3.5 nearest neighbour)
• indices including ecological footprint, HDI	(2.2.2 HDI) (2.1.9 footprint))
• measures of correlation, including a scatter plot, lines of best fit and Spearman Rank	(1.1.6) (1.2.8) (3.4.2)
• inferential statistics, including Chi-square	(1.1.6) (1.2.8)

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Cartographic and graphical material: • isoline and isopleth maps • choropleth maps • dot maps • flow diagrams and maps • proportional symbols • graphs, including scatter, line, bar, triangular • pie charts • population pyramids • cross-sections and long profiles • cross-sections and long profiles	 (2.1.4) (3.3.3) (1.3.6) (1.3.8) (1.3.6) (1.3.9) (2.2.1) (1.3.5) (2.1.7) (1.2.1 line) (1.2.2 line) (1.1.6 scatter) (1.3.2 triangular) (2.1.3 bar) (2.1.5 bar) (2.1.9 line) (3.6.1 bar) (3.5.4 scatter) (3.4.3 bar) (2.2.2) (1.3.4) (3.3.5) (3.4.6 pie) (1.3.7 population pyramids) (1.1.7) (1.1.8 long profile) (3.2.5 cross-section) (1.2.6 radial)
Digital and geo-located data: • geospatial technologies including aerial photographs, digital images, satellite images, geographic information systems (GIS), global positioning systems (GPS), databases	(1.1.5) (1.2.5) (3.6.3) (3.6.5)
Classification	(3.2.3) (3.6.4) (3.5.2) (3.4.1)
Qualitative skills	
Cartographical information for: • landscape system identification • land-use identification • risk assessment	 (1.2.7) (1.1.6) (2.1.4) (2.2.7) (3.1.2)
Cartographic and graphical material: • mental maps • GOAD plans • thematic maps • Ordnance Survey maps (1:25 000 and 1:50 000)	 (1.3.1) (3.3.6) (1.3.2) (1.3.10) (1.1.4 Geology map) (2.2.9 zoning) (3.3.1) (3.3.4) (3.4.3) (3.5.2) (3.6.2) (1.1.3) (1.1.10) (1.2.10) (1.3.9)
Digital and geo-located data: • geospatial technologies including aerial photographs, digital images, satellite images, geographic information systems (GIS), global positioning systems (GPS), databases • field sketches	 (1.1.5) (1.2.5) (1.3.1) (3.6.3) (3.6.5) (3.1.3) (3.1.5) (3.6.2) (1.2.9) (1.1.3)

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Textual and visual sources: • interview material • images • factual text / media • discursive / creative material • oral histories • system's diagram • flow diagram	 (1.3.1) (1.3.7) (1.1.9) (2.2.5) (3.3.7) (3.2.6) (3.1.1) (3.4.5) (3.6.5) (1.3.9) (2.1.8) (2.2.4) (3.6.4) (3.6.7) (2.2.10) (3.3.2) (3.6.7) (3.2.7) (3.1.4) (3.5.5) (2.2.6) (1.3.1) (3.2.4) (3.5.3) (3.4.7) (1.3.3) (2.2.3) (3.5.6) (1.2.1) (2.1.1) (2.1.2) (2.1.10) (3.2.2) (1.1.1) (2.1.6) (2.2.1)
Classification	(1.3.8) (1.3.9)

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APPENDIX C
Non-exam assessment grids

The following assessment grid is to be applied to marking Component 4 (non-exam assessment), the independent investigation.

Introduction	Methods of investigation	Data presentation
15 marks **AO1 (10 marks) and AO3.1 (5 marks)**	**15 marks** **AO3.1 (10 marks) and AO3.2 (5 marks)**	**10 marks** **AO3.3 (10 marks)**
13-15 marks • A research question is clearly identified • Clearly linked to the specification • Supported by use of existing, relevant knowledge • Risk / ethical issues are included • Concepts, processes, interactions and changes are well contextualised where necessary	**13-15 marks** • Detailed description of a range of appropriate data collection methods / techniques and sampling methods; the candidate's role in data collection is given • Thorough and well-reasoned analysis and justification of data collection methods and where relevant, any difficulties	**9-10 marks** • Accurate and developed use of appropriate and more complex qualitative and / or quantitative data presentation methods / techniques • Uses a detailed locational map and observational / cartographical techniques as appropriate to contextualise field area
10-12 marks • A research question is identified • Linked to the specification but clarity is not fully developed • Supported by use of existing knowledge, although it may lack clarification • Some risk / ethical issues are included • Concepts, processes, interactions and changes are contextualised where necessary	**10-12 marks** • Clear description of appropriate data collection methods / techniques and sampling methods; the candidate's role in data collection is given • Secure analysis and justification of data collection methods and where relevant, some mention of any difficulties	**7-8 marks** • Developed use of appropriate qualitative and / or quantitative data presentation methods / techniques • Uses a locational map and observational / cartographical techniques as appropriate to contextualise field area
7-9 marks • A research question which lacks clarity is given • Links to the specification are imprecise • Supported by generalised or basic use of existing knowledge • Concepts, processes, interactions and changes are not consistently contextualised	**7-9 marks** • Partial description of appropriate data collection methods / techniques and sampling methods; some detail on the candidate's role in data collection is given • Adequate analysis and justification of data collection methods	**5-6 marks** • Partial use of appropriate qualitative and / or quantitative data presentation methods / techniques • Includes a locational map to contextualise field area
4-6 marks • A research question is very weakly stated • Links to the specification are very thin • Supported by very limited use of existing knowledge • Concepts, processes, interactions and changes are not demonstrated	**4-6 marks** • Basic description of appropriate data collection methods / techniques and sampling methods; very little detail on the candidate's role in data collection is given • Tentative analysis and / or justification of data collection methods and where relevant, any difficulties	**3-4 marks** • Basic use of appropriate qualitative and / or quantitative data presentation methods / techniques • Includes a basic locational map to contextualise field area
1-3 marks • A research question is implied or very generalised • Links to the specification are not stated • Undeveloped use of existing knowledge	**1-3 marks** • Superficial description of data collection methods / techniques and sampling methods used; the candidate's role in data collection is omitted • Simple statements, largely descriptive of analysis and / or justification of data collection methods	**1-2 marks** • Superficial use of appropriate qualitative and / or quantitative data presentation methods / techniques • A locational map to contextualise field area is simplistic or not included
0 marks Response not creditworthy or not attempted	**0 marks** Response not creditworthy or not attempted	**0 marks** Response not creditworthy or not attempted

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Analysis and Interpretation of findings and location	Conclusions and Presentation requirements	Evaluation
10 marks **AO3.2 (10 marks)**	**10 marks** **AO3.3 (10 marks)**	**20 marks** **AO2.1c (20 marks)**
9-10 marks • Clear statement and justification of use of location(s) • Thorough and well-reasoned analysis and interpretation of methods of data presentation and findings (data sets), including relationships between the data • Clear consideration of bias, errors, anomalies and misuse of data as relevant	**9-10 marks** • Provides thorough conclusions that are linked back to the research question(s) • Produces a well-structured, concise and clear written report; full and appropriate references	**17-20 marks** • Effective evaluation of knowledge gained during the investigation to existing knowledge on the selected topic • Perceptive review of strengths and weaknesses of the investigation • Valid suggestions for further research and / or improvements pertinent to the investigation • Demonstrates some individuality and / or insights into links between the study and other aspects of geography which are not necessarily in the specification
7-8 marks • Competent statement and justification of use of location(s) • Secure analysis and interprets processes methods of data presentation and findings (data sets), including relationships between the data • Considers bias, errors, anomalies and misuse of data as relevant	**7-8 marks** • Provides effective conclusions that are linked back to the research question(s) • Produces an appropriately structured written report; appropriately referenced	**13-16 marks** • Secure evaluation of knowledge gained during the investigation to existing knowledge on the selected topic • Competent review of strengths and weaknesses of the investigation • Tentative suggestions for further research and / or improvements pertinent to the investigation • Partial insights into links between the study and other aspects of geography
5-6 marks • Loose statement and partial justification of use of location(s) • Adequate analysis and interpretation of processes, methods of data presentation and findings (data sets) • Considers one or two issues of bias, errors, anomalies and misuse of data as relevant	**5-6 marks** • Provides competent conclusions that are generally linked back to the research question(s) • Produces written report with a reasonable attempt at structure; references are included	**9-12 marks** • Evaluation of knowledge gained during the investigation to existing knowledge on the selected topic but not always balanced • Unbalanced review of strengths and weaknesses of the investigation
3-4 marks • Vague statement and some or implied justification of use of location(s) • Tentative analysis and interpretation of processes, methods of data presentation and findings (data sets), including relationships between the data	**3-4 marks** • Provides rudimentary conclusions that are occasionally linked back to the research question(s) • Produces written report with limited structure; • References either lack organisation or are partial	**5-8 marks** • Partial or very tentative evaluation of knowledge gained during the investigation to existing knowledge on the selected topic
1-2 marks • Very limited statement and little, if any justification of use of location(s) • Simple statements, largely descriptive of analysis and interpretation of processes methods of data presentation and findings (data sets)	**1-2 marks** • Provides description of issues and / or information as opposed to conclusions that are rarely if ever are linked to the research question • Produces written report that lacks structure; references are missing	**1-4 marks** • Very limited, if any evaluation of knowledge gained during the investigation to existing knowledge on the selected topic
0 marks Response not creditworthy or not attempted	**0 marks** Response not creditworthy or not attempted	**0 marks** Response not creditworthy or not attempted

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APPENDIX D
Opportunities for fieldwork

Opportunities for fieldwork
The following list provides suggestions of fieldwork opportunities that may be carried out in relation to each theme; these suggestions are designed as guidance in order to provide starting points and are neither comprehensive nor mandatory.

Suggestions where the field element is in brackets may be studied using either primary or secondary data.

Component 1: Changing Landscapes and Changing Places

Coastal Landscapes

- Field survey of wave characteristics (wave height, frequency, wavelength) along a stretch of coast
- Field survey of changing erosion and deposition on a stretch of coast before and after a storm to look at the impact of processes on coastal features (possibly using previous field work records)
- Field survey of raised beaches to look at their distribution, height and post-glacial modifications
- Mapping areas of weathering and mass movement and their relationship to geology maps
- Field survey of coastal erosion features: cliff height and profiles (hard rock / soft rock contrasts), mapping of incidence of faults, joints, and bedding planes to study the distribution of micro features e.g. caves, arches and stacks and the relationship between erosional features and geology maps
- Field survey of beach profiles: long and cross transects to map changes in beach material, gradient, pebble length (long axis) and pebble roundness along a transect from low to high tide and across the width of the beach (linking to the process of longshore drift)
- Field survey of a single or double spit using a range of transects to study shape, size and type of deposits on windward and lee sides (linking to the process of longshore drift)
- Field survey of sand dunes using transects to show dune topography, plant zonation and succession
- Field survey of a salt marsh using transects to show salt marsh topography, plant zonation and succession
- Field survey of impact of humans on coastal environments - foot path erosion, trampling of dunes, beach litter (in and out of season, before or after each clean up)
- Field survey of coastal management schemes along a stretch of coast threatened by either erosion or flooding to investigate the impact of management structures on sediment transfer e.g. groynes; undertake cost benefit analysis or study shoreline management plans

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Glaciated Landscapes

- Field survey of size (height of back wall etc.) shape, orientation and distribution of corries in a defined area
- Field survey of distribution and characteristic features of a glaciated valley (long and cross sections, occurrence of striations, distribution of erosional and depositional features, post glacial modifications)
- Field survey of distribution and formation of depositional features (glacial v fluvio-glacial deposit analysis – size, shape, stratification) in an area of lowland ice sheet glaciation
- Field survey of size, distribution, shape and stoss end orientation of a drumlin swarm ('basket of eggs' topography)
- Field survey of scree to measure slope, degree of sorting, mapping of source and extent of scree and vegetation colonisation to assess if scree is an active or fossil feature
- Field survey of glacial till: till fabric analysis (situation, orientation and shape) to map provenance and movement of ice in a defined area
- Field survey of kettle holes / lakes to investigate succession (hydrosere)
- Field survey of vegetation succession on moraines (lithosere in an area of glacier retreat)
- Field survey of discharge from meltwater streams (currently glaciated environment)
- Survey of glacier mass balance (currently glaciated environment)

Changing Places

- Visual survey of variations in townscape / landscape
- Internet perception survey of place / region e.g. contrasts in safety (day and night)
- Field survey of changing service provision in villages
- Field survey of changes in or characteristics of suburbanised villages: population size and structure, employment characteristics, housing and community spirit
- Field survey of changes in rural areas associated with rural change: holiday homes, language issues, population size and structure, employment and house prices and problems of service provision
- Field survey of building age, type and quality for evidence of gentrification
- Field survey of the social characteristics and service structure of inner cities
- Field survey of employment changes (quality and number of jobs) in Development Area / Enterprise zones
- Field survey of central areas of a city to look at changes in land use, quality of the environment, footfall and characteristics of cultural quarters
- Field survey of central areas of a city to identify the 'core' and 'frame', zones of assimilation and discard
- Field survey of student districts in urban areas: population characteristics, service provision, attitudes of local residents and housing quality/tenure
- Field survey of variations in ethnicity within urban areas
- Field survey of variations in levels of deprivation in urban areas: environmental quality, unemployment rates, crime levels, housing tenure, council tax bands, benefit uptake
- Field survey of the environmental quality of purpose built business parks
- Field survey of the environmental, social and economic impacts of a single, large tertiary employers e.g. a hospital complex
- Field survey of impact of tourism on honey pot sites

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- For urban or rural re-branding – assessment of the success of flagship projects e.g. sports sites, festival sites, tourism projects to assess environmental, economic, social and cultural impacts
- For any rebranding / regeneration projects – assessment of their sustainability in terms of linkage and involvement to local community, conflicts, economic success, quality of jobs, impact on poor people in an area and likelihood of being value for money and a permanent success

Component 2: Global Systems

Water and Carbon Cycles

- Field measurements of infiltration rate variations due to soil type, vegetation, relief and antecedent conditions
- Field measurements of river discharge
- Field measurements of throughfall
- Field survey of drainage basin characteristics: land use, vegetation, slope, soil permeability / infiltration and their impact on river discharge
- Field survey to compare the characteristics of two drainage basins
- Field measurements of discharge over selected times in a year to look at river regimes in relation to season
- Field measurements of a minor storm event and its impact on discharge in a small stream catchment
- (Field) survey to investigate flooding recurrence levels and areas of flood risk/ vulnerability (GIS)
- (Field) survey of the impact of a sustained period of drought on water supply and water use, vegetation, sales of summer products (ice creams, salads) and summer activities
- Field survey of the impact of a single extreme weather event
- Phenology studies to look at climate change on natural and human activities (appearance of catkins or snowdrops, first and last marking of lambs, putting sheep inside / lambing etc.)
- (Field) survey of the impact of human activity (urbanisation, agriculture and deforestation/afforestation) in drainage basins
- Field survey to investigate biomass and leaf litter (organic carbon) loss from a drainage basin in relation to rainfall runoff
- Field measurements of dissolved (solute) and / or particulate organic carbon carried by water (using filters or making observations about water colour, etc.)

Global Governance: Change and Challenges

- (Field) survey of the impact of migration on a particular community: provision of shops, services, schools, places of worship, distribution of groups, housing types, employment, official services (language), index of segregation
- (Field) survey of the distribution of ethnic food outlets and restaurants in a designated area
- (Field) survey of variations in ethnicity within urban areas
- Field survey of variations in levels of deprivation in an urban with a high proportion of immigrants: environmental quality, unemployment rates, crime levels, housing tenure, council tax bands, benefit uptake
- Survey of how people use social networks to maintain contact with families
- Field survey of beach to look at distribution and type of sea borne materials (after a storm and post clean up) as well as land supplied litter and waste
- (Field) survey of impact of EU fishing policies on the fishing industry of a designated port (numbers employed, catch levels, fishing related industries)
- (Field) survey of water quality and management of water quality in coastal areas (blue flag beaches)
- (Field) survey of threatened coastal environments (e.g. sea horse breeding grounds at Studland)

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Component 3: Contemporary Themes in Geography

Optional Themes

Ecosystems

- Field survey of local nature reserves such as SSSI, RSPB reserves to research reasons for designation, viability, sustainability issues or on the quality and biodiversity of the reserve
- Investigation of Biological Action Plans to assess success of work of local conservation organisations such as wildlife trusts
- Field survey of the threats to and impacts on ecosystems from tourism
- Field survey of sand dunes using transects to show dune topography, plant zonation and succession studying changes in physical features (infiltration, pH, wind speed, % of bare ground) and associated changes in biotic characteristics (% plant cover, species diversity, plant height) (psammosere)
- Field survey of impact of trampling on vegetation (% plant cover, species diversity, plant height)
- Field survey of salt marsh using transects to show salt marsh topography, plant zonation and succession studying changes in physical features (soil type, pH) and associated changes in biotic characteristics (% plant cover, species diversity, plant height) (halosere)
- Field survey of succession on margins of a small lake (hydrosere)
- Field survey of the effects of burning on heathland / moorland ecosystems
- Field survey of woodland management
- Field survey of conflicts associated with urban development on fragile environments
- Field survey of ecosystem management schemes including cost benefit analysis

- **Economic Growth and Challenge: either India <u>or</u> China**
- Survey of impact of FDI eg Tata in W Midlands, Chinese development around Manchester airport
- Survey of impact of Chinese or Indian diaspora in a named area

Energy Challenges and Dilemmas

- Survey of impact of thermal power station (oil and coal fired) on local microclimate , water air pollution levels, transport movements and employment
- Survey of social, environmental and economic impact of nuclear power station on designated area
- Survey of impact of energy efficiency measures on a named community, to include recycling, use of solar panels
- Survey of impact / potential impact of solar energy farm on neighbourhood
- Investigation of potential sites for location of wind farms
- Survey of impact of coalmining on a former mining area, exploring image, culture, health issues and environment, socio-economic impact and measures to rebrand
- Survey of environmental impacts of alternative energy schemes, e.g. wind farms, solar energy farms
- Survey of potential impact of a new power station

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Weather and Climate

- Field survey of urban microclimate – measuring temperature, relative humidity, wind strength, light intensity along a transect from the inner-city to the suburbs recording building height and land use changes
- Field survey of perception of the characteristics and impacts of a climatic hazard (drought, storm)
- Field survey of changing weather in a selected area over time

Development in an African Context

- Investigation of the characteristics and effectiveness of a strategy designed to address the causes of desertification
- Investigation of the characteristics and effectiveness of a strategy designed to manage the consequences of desertification
- Investigation of the impact of a micro-finance scheme on a local community

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