Edexcel GCSE Geography A

Practical support to help you deliver this Edexcel specification

Edexcel GCSE Geography A offers a thematic approach to studying geography and the content is split by physical and human geography. As with all GCSEs, the guided learning hours is 120 hours over two years. This document provides a topic guide for teaching Component 1, Topic 1, and can be adapted by centres to fit their own contexts and teaching styles. It has been produced as an example approach and is not intended to be prescriptive. The topic guides indicate resources that you can use to support your teaching. These are only suggestions and you are encouraged to use a wide range of resources to suit the needs of your own students.

The advised teaching time for Topic 1: The changing landscapes of the UK, is 15 guided learning hours. This requires some blending together of the detailed content. In the guidance below, suggestions are made about contextualisation or stretch challenges that may be suitable for more able students, as well as expected lesson outcomes for those less able. Please note that these are suggestions only and not specific syllabus requirements.

The two- and three-year course planners suggest appropriate times to introduce this material.

Synoptic linkages and case study nesting

It is suggested that you select located examples that complement each other. For example, it may be possible to study the impact of tropical storms in areas such as the Philippines, while also focusing on the characteristics and issues in tropical forest biomes in the same area.

Topic Booklet for Component 1, Topic 1: The changing landscapes of the UK

Introduction

Quick Overview

The changing landscapes of the UK comprises two main areas of teaching:

1) An overview of the UK's physical landscape which can be sub-divided into:

- a geological variation in the UK to include differences in rock types, and the role of geology and tectonic processes in the development of upland and lowland areas.
- a focus on how human and physical processes have helped form these distinctive upland and lowland areas.

2) A choice of two from three options, focusing on the landscape and processes of either Coasts, Rivers or Glaciated areas. These will focus on how physical processes combine to create landforms and landscape; how human activities impact upon the landscape; how the physical and human characteristics combine to create a distinctive landscape.

The aim of the topic is to give students a grasp of the main physical processes which are at work in the UK. These will help students understand the formation of local landforms, and help foster an understanding of how these landforms combine to make landscapes. Focusing on the human activities at work on these landscapes will help students develop a holistic understanding of the processes influencing the physical landscape.

Key ideas 1.1 and 1.2 – Overview of the UK's physical landscapes

The overview of the UK's physical landscapes is designed to be just that – an overview. With this in mind, the suggested teaching time is only two weeks with the content divided as follows over the two-week period:

Lesson 1 – Key idea 1.1 (1 hr)	There are geological variations within the UK
Lesson 2 – Key idea 1.2 (1 hr)	A number of physical and human processes work together to create distinct UK landscapes

Much of this content may appear daunting as it is new content. However, the depth required here is an overview of the key points. It is however important for students to learn vocabulary associated with the rock types. Below is key vocabulary for topics 1.1 and 1.2.

Key vocabulary for Key ideas 1.1 and 1.2

Key idea 1.1	Key idea 1.1 (cont…)	Key idea 1.2
Geology Igneous rock - Granite - Basalt Sedimentary rock - Chalk - Sandstone Metamorphic rock - Schist - Slate Tectonic activity - Convergence - Divergence	Rock characteristics - Crystalline - Clastic - Extrusive - Intrusive - Joints - Faults Upland landscapes - Hills - Mountains Lowland - Valleys Basin	Glacial Deposition Weathering - Freeze thaw - Carbonation - Onion skin Glacial Erosion - Abrasion - Plucking Transportation Slope processes - Landslides - Slumping - Soil creep Human activity - Agriculture - Forestry - Settlement

Lesson 1: There are geological variations in the UK

Overview

This should be broken, where possible, into two lessons – 1) the characteristics and distribution of different types of geology, and 2) the role of geology and tectonic processes in the formation of upland and lowland areas. Students should be able to make the link between the rock types and either upland or lowland areas.

More able students may wish to create sketches of rock types and provide more detailed annotation of a range of characteristics. They may also wish to consider why the geology is distributed where it is in relation to Earth's history.

Less able students should focus on learning key rock types and a few simple characteristics of each – a table of characteristics would be helpful. A labelled map to show where rocks are mainly distributed will help.

Key concepts and processes

Students should have a clear grasp of the differences between the three main rock types; Igneous, Sedimentary and Metamorphic. These are given below:

Igneous – a rock formed from cooled and solidified magma. There are two main types: those that cool below the ground (*intrusive*) and those that cool after being erupted (*extrusive*).

Metamorphic – a rock formed from the transformation of an existing rock into a new rock type. The cause of the change is an increase in heat and/or pressure.

Sedimentary – rocks formed from deposits of material which has originally come from older rocks or living organisms.

For the characteristics of each rock type the students should be able to describe some of the following:

Igneous: Intrusive/extrusive, fine/coarse crystals, colour, identification of key minerals.

Metamorphic: size of grain, colour, whether minerals have an orientation, whether they are formed under low/medium/high pressure and temperature.

Sedimentary: size of sediments, what they are made from, where they are made.

Teaching rock types and characteristics can be a little dry. One way of engaging students is to access hand specimens of different rock types (from the British Geological Survey [BGS], Geological Association, GeoSupplies and UKGE) and get students to undertake simple tests or descriptions. The key thing with rock types is to keep it simple and define the characteristics you would like the students to find. More able students will be able to compare the differences in rock type.

The **distribution** of the main geology in the UK is complex, but can be summarised as sedimentary rocks mainly in the east and metamorphic and igneous rocks more prolific in the west. This often reflects the relief in the UK, with upland areas linked to the more resistant igneous and, in some cases, metamorphic rocks. This distribution is a reflection of the tectonic history of the UK (which does not need to be understood).

The harder igneous rocks found in the west of the UK have led to the classic upland landscapes of Snowdonia, North Wales; the Lake District; and the Scottish Highlands as well as the moorlands of Devon and Cornwall. The softer material such as clays in the east of England have either been formed as a result of uplifted sea sediments or glacial deposits from the last main glaciation 12,000–18,000 years ago. As a result they form less-resistant geology and relatively flat and fertile lowland landscapes. Uplifted chalk in the east helps form the undulating landscape of the south east.

Distribution of rocks in the UK can be made more visual using the Map of British geology (BGS make-a-map tool). This enables the teacher/student to add or remove rock types and their locations in the UK. Teachers ultimately want students to be able to understand distributions and link these to places.

The influence of tectonic activity could potentially be a tricky topic if there are a range of abilities in the class. Again being able to link activity to places – for example, creating an overlay map of relief overlaid by tectonic process – could help students' explanations. Using visual aids from the Geological Society may help. Alternatively, giving the students information and encouraging them to sort it or match it to the correct location may help less able students.

Guidance on teaching

- Memory exercises (from board – giving students a finite time to see resource) to remember distributions then plot the rock types in the UK
- Back-to-back exercise to help students teach each other (and draw by memory) locations of geology
- Annotated maps using GS or BGS source material

Further reading

- Understanding Geology – David Webster
- British Geological Survey – Map of British geology
- Geological Society – Rock types
- Geological society – Information about plate tectonic activity in the UK
- Geological society – Link to teacher notes on geology
- Geological society – Glossary of terms

Lesson 2: A number of physical and human processes work together to form distinctive landscapes

Overview

This topic should be taught firstly looking at the physical processes, then focusing on the human impacts and lastly looking at the interaction between them. The first part of the teaching should focus on an understanding of the physical processes (the impact of glacial erosion and deposition, weathering processes, the influence of river processes, slope processes and climatological processes) which help produce different upland and lowland landscapes. Although the specification does not require specific places, it may be easier to focus on the examples to exemplify the range of processes which act upon the area. If you follow this approach, be sure to pick an area which is subject to the human processes in the specification.

The more able students should be able to make links between the different physical and human processes to understand the formation of the upland and lowland areas.

The less able students should have a basic overview of the different processes which can act upon upland and lowland areas and a basic notion of how they may cause it to appear like it is today.

Key concepts and processes

Students will need to understand the terminology of the main physical processes (glacial erosion and deposition, weathering, river process (erosion, transportation and deposition), slope processes and climatology. They will also need to know how these have led to the formation of upland and lowland areas.

Types of glacial erosion will include abrasion and plucking, while an overview of glacial deposition will help students understand some upland and lowland landscapes. Weathering processes are common throughout the UK. However, the physical process freeze thaw is more common in upland areas due to the diurnal temperature changes. It may be necessary to link some weathering types to certain rocks, for example carbonation is more common on sedimentary rocks made of calcium carbonate e.g. chalk, while most rocks are subject to the process of oxidation. The biological weathering processes, such as root action, are more common where there is vegetation, so less likely at the peaks of upland areas. Post-glacial river processes are familiar to students at GCSE, though it may be wise to think about reasons for vertical erosion in the upland environment.

Slope processes are also a familiar process at GCSE and the impact of slumping, landslides and soil creep is covered in the current Edexcel A specification. The impact of climate on landscapes is less obvious as it often is a driver for all other processes. Therefore an understanding of why, for example, the western UK has more rainfall will lead to why there is greater erosion or slope processes in these areas. Making links between the processes is something higher ability students may wish to do, though this is only an overview of the main physical processes in the UK. Linking the physical processes to upland areas where evidence of all of the above is common would be wise, therefore, giving a sense of place to the overview. The Lake District and Wales are logical places to focus on for upland areas, while the south east, or East Anglia would be characteristic of the lowland areas. Students need to try and find links between the processes and the upland/lowland areas to fully understand the impact physical processes have on these areas.

This section does not require an in-depth study of any one landscape (coastal, river or glaciated).

Humans also have an important impact on the landscape. The key focus of the overview is to look at how forestry, agriculture and settlement can have an impact on the landscape. The following examples help provide an idea of the types of impacts which could be considered:

In this photograph of the **Forest of Bowland**, forestry has exposed the hillside and subjected it to increased precipitation, which could lead to greater flooding or mass movement as interception is decreased.

Similarly, in this photograph, the farmer's field is turning the landscape yellow with the distinctive rapeseed oil. Farming has historically had a huge impact on the UK landscape giving it the distinctive patch-work nature of field patterns. Rapeseed oil has become increasingly popular with farmers with prices increasing from £288 per tonne in 2010 to £522 in 2015. The creation of human waste (as seen here) is creating artificial hills as masses of waste are deposited to accommodate a consumer lifestyle.

Guidance on teaching

Analysing photograph is a good way to introduce students to the human impact on landscapes, which can be easily achieved in class.

Sketching and photography in the field is an alternative way to understand either physical processes or human impact on landscapes. This page on Sketching and Photography by RGS will guide students through good practice.

Using material from the BGS and the Geological Society could help provide resources for the physical processes. Students could use these to create annotated maps of the UK with imported images and text boxes to show the distribution of processes and the link to landforms.

Students could be extended by having cards of each physical process affecting the UK and, in pairs, trying to describe to each other the link between them. The students could write up the links between three of these.

Students could research an area/landform in either an upland or lowland area and produce a simple guide to the physical and human impacts upon it.

There is also the opportunity to extend student skills by using OS maps to create cross sections of either upland or lowland areas. The following links will help teachers guide students through creating a cross section: Pearson guide to creating cross-sections or this Geographypods guide. Students could annotate onto their cross-sections examples of the human impact or physical processes acting on the landscape.

Further reading

- Understanding Geology – David Webster
- Understanding Earth – Grotzinger and Jordan (not specifically focused on UK but good background)
- Notes on weathering from Geological Society – notes on weathering
- Landslides in UK - BGS report on landslides in UK
- BGS introduction to landslides - Discovering landslides
- BGS introduction to glaciation in UK - Ice and our landscape

Optional sub-topics 1A, 1B and 1C

The second part of Topic 1 requires centres to make a choice of studying **2 from 3 option topics**. The options are Topic 1A: Coastal landscapes and processes, Topic 1B: River landscapes and processes or Topic 1C: Glaciated upland landscapes and processes. These units will require a more in-depth study of the processes, landforms, human impacts and landscapes found in each environment. However, much of the process and landform content detailed in the specification is content which has been covered by previous GCSE specifications (pages 9–11 in the new specification). Therefore this topic guide will give a brief overview of the content which has previously been covered and a more detailed overview of the new content.

The table below gives a suggestion of time allocation based on the suggested 8 weeks (with 2 x 1-hour periods of teaching time per week) for both chosen topics. In the table below, sub-topics 1A and 1B have been used as examples.

Week	Key idea	Detailed content
1A: Coastal landscapes and processes		
1	1.3 A variety of physical processes interact to shape coastal landscapes	• Physical processes to include weathering, mass movement, erosion, transport and deposition • The influence of geological structure, rock type and wave action on landforms • The impact of weather and climate on the coast (erosion/retreat/impact)
2	1.4 Coastal erosion and deposition create distinctive landforms within the coastal landscape	• The role of erosion in the development of headlands and bays, caves, arches, stacks and stumps and, wave-cut platforms • The role of deposition in the development of bars, beaches and spits
3	1.5 Human activities can lead to changes in the coastal landscapes which affect people and the environment	• How has urbanisation, agriculture and industry affected coastal landscapes? • The effect of coastal recession and flooding on people and the environment • The advantages and disadvantages of coastal defences (hard and soft engineering) and their impact on the coastal landscape
4	1.6 Distinctive coastal landscapes are the outcome of the interaction between physical and human processes	• The significance of one named coastal landscape to include its formation and factors influencing its change

1B: River landscapes and processes		
5	1.7 A variety of physical processes interact to shape river landscapes	• Physical processes to include weathering, mass movement, erosion, transport and deposition • How landscapes contrast between upper, mid and lower courses of rivers and channel characteristics change along a named UK river • The impact of weather and climate on river landscapes
6	1.8 Erosion and deposition interacting with geology create distinctive landforms in river landscapes	• The role of erosion and influence of geology in development of interlocking spurs, waterfalls, gorges and river cliffs • The role of deposition in the formation of floodplains, levees and point bar • The interaction of erosion and deposition to develop meanders and oxbow lakes
7	1.9 Human activities can lead to changes in the river landscapes which affect people and the environment	• How urbanisation, agriculture and industry affect river process and landscapes • The physical and human causes and effects of river flooding • Advantages and disadvantages of river engineering and how they can change river landscapes
8	1.10 Distinctive river landscapes are the outcome of the interaction between physical and human processes	• The significance of one named river landscape to include its formation and factors influencing its change

This table is used as a guide and it may be possible to move some of the content around. Most the content is theoretical, except for the study of a landscape which requires specific located detail. However, there is a need to use teaching time wisely to accommodate the content in this section of the specification (especially if teaching over two years).

Key vocabulary for sub-topics 1A, 1B and 1C

Topic 1A: Coasts	Topic 1B: Rivers	Topic 1C: Glaciated uplands
Weathering - Mechanical - Chemical - Biological Mass movement - Slides - Slumping Erosion - Abrasion - Hydraulic action - Attrition - Solution Transport - Traction - Saltation - Suspension - Solution - Longshore drift Deposition Geological Structure - Concordant - Discordant Wave action - Destructive - Constructive Seasonality Storm frequency Prevailing wind Hard engineering Soft engineering Landforms - Headlands and bays - Caves, arches, stacks and stumps - Wave-cut platforms - Beaches, bars and spits	Weathering - Mechanical - Chemical - Biological Mass movement - Slides - Slumping Erosion - Abrasion - Hydraulic action - Attrition - Solution Transport - Traction - Saltation - Suspension - Solution Upper course Middle course Lower course Channel shape Valley profile Gradient Discharge Velocity Sediment size/shape Hard engineering Soft engineering Landforms - Interlocking spurs - Waterfalls - Gorges - River cliffs - Floodplains - Levees - Point bar	Glacial erosion - Plucking - Abrasion Transport - Englacial - Sub glacial - Supraglacial Deposition Weathering - Freeze thaw (mechanical) Mass movement - Soil movement - Rock slides/falls Seasonal weather variation Diurnal weather variation Moraine Landforms - Truncated spurs - Corries - Arêtes - Tarn - Glacial trough - Hanging valley - Roche moutonnées - Crag and tail - Drumlins

Sub Topic 1A: Coastal landscapes and processes

Overview

There is a large focus on processes and landforms, therefore the key here is to learn terminology. Some of the physical processes cross over with other sub topics and therefore more time spent here could save time later on. It is important to understand processes so they can be applied to landforms. Human activities should be covered in a general context, as should the effects of recession and flooding. Managing coastlines with defences is a familiar concept. All of the above will need to be drawn together to understand a stretch of coastline and the relationships between human and physical factors in helping to form and develop this landscape over time.

Higher ability candidates should look to apply processes to landforms and try to consider reasons for differences in landforms between different places. They should be able to adopt a holistic outlook regarding the interactions between physical and human processes in the development of coastal landscapes.

Lower ability students should learn basic processes and sequences in landforms. They should be able to identify features in a landscape and try and make links between the features if possible.

Key concepts and processes

When focusing on the processes of weathering, students may wish to consider not only the meaning of the term, but also in what circumstances they occur and where they occur.

Focus on the different types of coastlines determined by geological form and structure: joints/faults and, more impressively, concordant and discordant coastlines. Comparing characteristics of constructive and destructive waves (focusing on frequency, height, length, force/energy, occurrence and swash and backwash) should be sufficient. However, more able students may wish to consider the different circumstances in which they occur. It may be possible to link back to Topic 1.1 and consider how the geology may affect retreat.

UK weather and climate should be linked to the differences in wave types and processes at different points around the coastline, depending on the weather. There should be consideration of fetch and weather system variation. With largest fetches and most weather systems prevailing from the west or south west there should be consideration of the differences in the processes. It may be possible to link to Topics 1.1 and 1.2 to consider how the general variation in UK geology and weather may have an impact on process.

A sequence should be incorporated into the teaching of landforms. Showing changes in landform development over time and linking the formation to the action of processes will enable a detailed understanding. It may be necessary to

consider reasons for either greater amounts of erosion or deposition (dependent on the landform) in the context of the landform formation.

The impact of human activities needs to focus on how such activities may have led to a greater or lesser risk of erosion or flooding. The main focus needs to be on urbanisation which is fairly obvious through greater numbers of housing developments or the development of tourism. Agriculture at the coast may look at changes in the coastal ecosystem and look at possible impacts on slope stability or ground saturation. Industry at the coast needs managing, from either perspective of the pollution it creates or the fact that the sea could influence the infrastructure. Introduce the idea of ever-increasing competition/conflict at the coast – settlement; agriculture; industry; tourism; conservation. This section could be combined with the teaching of 1.6 so that the human impacts have a specific context.

Management of the coastline needs to focus on the different types of hard and soft engineering outlined in the specification. For each, a comparative summary of the advantages and disadvantages is needed. However, focus on the impact that the engineering has; for example, groynes can prevent longshore drift which means that there is less transported material down the coastline leading to smaller beaches.

Guidance on teaching

The teaching of 1.6 requires a focused case study on a stretch of coast which will incorporate many of the aspects from 1.3–1.5 to help determine the formation and development of distinctive components of the landscape. The example of **West Wight** encapsulates some of what may be required – see Figures 1 and 2.

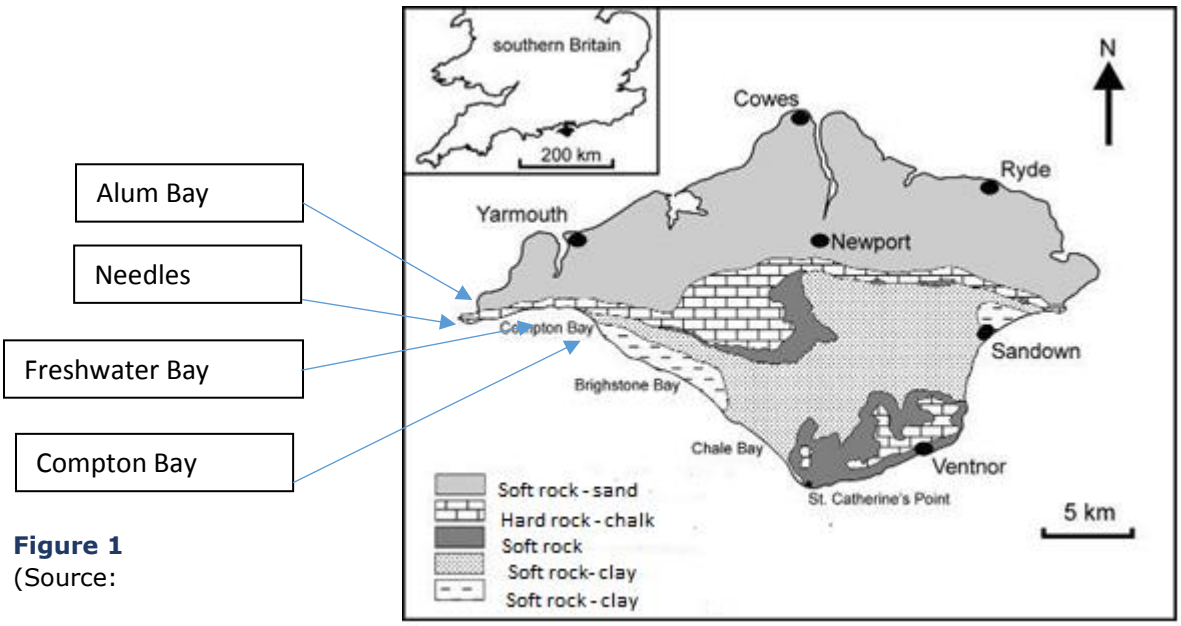

Figure 1
(Source:

http://www.wightfarmholidays
.co.uk/iow/fossil-collecting-isle-of-wight-geology-and-palaeontology/)

The geology of the Isle of Wight has been subject to a range of processes which have given rise to a number of coastal landforms and these, together with the impact of people on that area, created a distinctive landscape. These can be shown in the photographs which correspond to the numbered areas on the map.

This area is subject to waves from a south westerly direction where the fetch from France can be between 50 and 100 miles. Low pressure weather systems often pass the area giving the area 700–900mm of rainfall per year.

Figure 2 – Compton Bay

The weaker Wealden Clays and Greensand rock suffers from high rates of erosion and slumping. The area is a popular beach for surfers but access and parking have been problematic. Nearby cattle farms have also suffered from loss of cattle where the ground has slumped onto the beach. The A3055 road, which is the only access to the area, had to be taken back from the coast to stop it being impacted by the receding cliffs, which have lost 5–10m in the past 20 years. Use of old OS maps will show the recessions over time.

The chalk ridge passing Freshwater has been eroded by the River Yar creating a distinctive headland and bay formation. There are stacks and stumps which have developed on the eastern side of the bay and wave-cut platforms on both sides of the bay. The bay itself is shingle deposited by constructive waves, as they break into the bay. The area is popular for sailing and water sports and has the Albion hotel on the western edge of the bay. This has had to be defended with a sea wall to protect it against erosion in times of stormy weather (in winter). The steep chalk cliffs are eroding at a slow rate and are subject to rock falls.

The Needles and Alum Bay form a discordant part of the coast line. The Needles, a popular tourist attraction and famous example of a stack formation, are found at the western-most edge of the chalk ridge and the Isle of Wight. North of the Needles is Alum Bay, famous for its coloured sands and 'theme park' – it serves as a popular tourist attraction. Part of the attraction is a chairlift down the coloured cliffs to the beach edge, which has been reinforced due to erosion of the cliffs. The bay is protected by the headland to the south from the full fetch of the south westerly winds (and waves).

Students can develop research into all aspects of coastal landscapes but will need to have a coastal area which has variety. Many stretches of UK coastlines subject to erosion require the protection of coastal defences. Examples include, Holderness, the Jurassic coastline (Dorset), the Norfolk coastline, and the south-west coastline.

Further reading

BBC bitesize link to coasts –
http://www.bbc.co.uk/schools/gcsebitesize/geography/coasts/

Sub Topic 1B: River landscapes and processes

Overview

There is a large focus on processes and landforms, therefore the key here is to learn terminology. Some of the physical processes cross over with other sub topics therefore more time spent here could save time later on. Understanding how rivers change downstream may help students understand the reasons for occurrence of landforms. It is important to understand processes so they can be applied to landforms. Human activities should be covered in a general context, as should the effects of recession and flooding. Managing rivers with defences is a familiar concept. All of the above will need to be drawn together to understand a stretch of river and the relationships between human and physical factors to help form and develop this landscape over time.

Higher ability candidates should be able to apply processes to landforms and try to consider reasons for differences in landforms between different places. They should be able to adopt a holistic outlook on the interactions between the physical and human processes in the development of river landscapes.

Lower ability students should learn basic processes and sequences in landforms. They should be able to identify features on a landscape and try and make links between the features if possible.

Key concepts and processes

There is a great deal of cross-over, regarding coasts and rivers, between the processes of weathering, mass movement, erosion, transportation and deposition. It is important to learn the correct terminology but more important to get the correct context for the action of these processes. If you can teach students about the processes and also about where they occur in rivers and perhaps why, this will certainly stretch the more able.

The changes in river characteristics are a key concept in enabling students to understand why certain landforms occur where they do. Although the

specification does not specifically cover this, understanding vertical and horizontal erosion patterns can help students understand the reason for many vertically eroding landforms such as gorges, waterfalls and interlocking spurs in the upper course and more lateral erosion and deposition based landforms (such as floodplains, meanders and levees) in the lower courses. The middle course is often a transitional area where both sets of landforms occur. More able students may wish to understand why different types of landforms occur in different places. Understanding the key changes in river characteristics (channel shape, valley profile, gradient, discharge, velocity and sediment shape and size) can also be applied to fieldwork, which will help with the requirement of applying these to a named river. There are useful video clips (on YouTube and Vimeo) such as River Severn source to mouth which can also give a perspective.

The impact of weather relates closely to the content covered in Topic 1.2. Thought should be given to the rainfall patterns in the UK, increased rainfall in the west, especially in highland areas, and the impact this may have on erosion rates, discharge and therefore velocity and channel size. In contrast, eastern rivers in the UK do not descend from the same altitudes or may not be impacted by different weather systems which could have an effect on their seasonal discharge patterns. This may be particularly relevant in rivers in the south-east of England which receives some of the least rainfall in the UK.

The role of landform formation should link closely to the material covered in 1.7 and should be tackled in a sequential manner. Students need to appreciate change over time and be able to explain the role of process in the formation of the landforms. The more advanced students may wish to consider the changes to similar landforms along the course of a river, or why a landform varies in size. The context of landform formation should also be considered, as some landforms may only occur in certain areas dependent on local geology.

The impact of human activities (urbanisation, agriculture and industry) does not need to be linked to a named location, but it may be prudent to link these activities to the teaching of Topic 1.10, where possible.

Human and physical causes of flooding are well documented in GCSE texts and an understanding of the different contributing factors will be necessary.

Managing rivers through engineering is also well covered in GCSE texts especially the advantages and disadvantages of hard and soft engineering. However, if approaching this topic from the idea of a table of different types it may be worth adding a column to show the impact of these on the landscape. For example, channelisation creates a concrete/stone barrier to the river bank, meaning that less erosion can occur, which will result in less meander migration or lateral erosion and, therefore, reduced development of future floodplains.

Guidance on teaching

The teaching of 1.10 requires a focused case study on a named river which will incorporate many of the aspects from 1.7–1.9 to help determine the formation and development of distinctive components of the landscape. The example provided on the next page may serve as an outline of the type of example you may wish to cover as it looks at landforms and human activity along the River Twiss in Yorkshire.

The River Twiss is located in Yorkshire and flows 2.59 miles through the village of Ingleton, before it joins the River Doe to become the River Greta.

It is an upland river and has some distinctive features notably two waterfalls, Pecca Falls and Thornton Force. The river, located in the Yorkshire Dales, is now a popular tourist attraction, found in the Ingleton Waterfall trail guide.

One of the famous waterfalls found here, Thornton Force, plunges 14m across a carboniferous limestone ledge, and across a relatively softer sedimentary rock called greywacke. From here it flows downhill crossing the greywacke (sandstone) before falling over the Pecca falls. The rock types here have been exposed by the North Craven Fault forming a drop in the landscape and creating the waterfall.

With the Ingleton railway nearby and easy access to Leeds and Manchester, this area has proved to be popular with tourism and needs management and the area has been designated a SSSI (Site of Special Scientific Interest).

Further details of the Ingleton waterfall trail can be found at http://www.ingletonwaterfallstrail.co.uk/trails.php#swilla-glen.

Students are encouraged to undertake fieldwork in local rivers to find out the human and physical interactions on local rivers. Focus should be on how the river landscape was formed and how people have subsequently started to use and modify the landscape.

Sub topic 1C: Glaciated upland landforms and processes

Overview

Although there are fewer process to learn here, there are less direct cross-overs with Coasts and Rivers – though some are relevant. There is much familiar material in the landform section of glaciers with focus on key erosional and depositional landforms. The section on human influence has links with previous GCSE specifications, while the distinctive landscape can focus on any previously glaciated upland area. The key human and physical impacts and processes can be combined to determine the formation of this landscape – which includes a range of features within a given area.

More able students should be able to find links between process and landforms and be able to use these to holistically develop their understanding of landscape development.

Lower ability students should focus on gaining a grasp of the processes, understanding the basic formation of key landforms and picking a couple of links between the human and physical environment to help them understand the formation of the distinctive landscapes.

Key concepts and processes

The main processes of erosion, transportation and deposition are similar to the content covered in previous GCSE specifications and also make links to Topic 1.2. There is some overlap with Coasts and Rivers but on the whole this is limited. Focus should be on terminology, although it is important for students, especially for more able students, to know where in the environment these processes take place and why. Students also need to differentiate between those processes which occurred when glaciation was evident and those that take place today in a post-glaciated upland environment. The weathering process freeze thaw took place in both.

Guidance on teaching

The impact of past climates can be a slight challenge. As this is a new topic, an example is provided here of how past climates affect periods of glaciation and how climate and weather changes with height, which will affect physical processes.

The climate of upland areas is key to determining what processes are at work in the upland environment. The greater the variation in the climate the more likely weathering and mass movement will occur. Prolonged periods of cold weather will lead to the formation of glaciated environments and therefore determine the extent to which glaciated processes are likely to occur.

This diagram shows how the climate of the UK has changed over the past 120,000 years and shows when it has been in periods of glaciation (colder) and post glaciation (warmer). Many of the glaciated features evident today in the UK, e.g. those in Wales, the Lake District and Scotland, are a result of the most recent glaciated period 10,000 years ago.

This image also gives an indication on a more localised scale as to how temperature changes with height.

Temperature changes approximately 0.6 degrees Celsius with every 100m in height. As a result, with increased altitude there is decreased temperature (as highlighted by this image of Ben Nevis). With increased height there is also increased precipitation and therefore weathering and mass movement processes will be more common at increased altitude. Ben Nevis is a good example of a

relic glaciated landform with its compacted snowfields on the north-facing slopes still evident throughout the year.

The formation of landforms covers the key erosional features (corries, troughs, tarns, aretes, hanging valleys, truncated spurs and roche moutonnees). The RGS site offers information on a variety of the landforms mentioned here and is a good starting point. The depositional landform, crag and tail, is also included in the specification – this link to Coolgeography glacial features will help understanding of a variety of landforms, including crag and tail, a common feature in Edinburgh.

The study of human activity in glaciated upland environments should focus on farming, forestry and settlement (though this could be part of a wider focus on tourism). The use of upland environments for water supply, renewable energy, recreation, tourism and conservation needs to be covered, with particular reference to how this can alter or change the environment. This may be linked in with the teaching of Topic 1.14.

The final part of the specification requires a focus on a distinctive upland landscape. This should look at the formation and the human and physical factors which have led to changes. As this is new content the example provided below should help give an idea of the type of place you may be expected to cover.

This section of the specification requires a named example of one distinctive upland glaciated landscape in the UK (karst limestone/igneous/metamorphic), how it has been formed and the most significant factors in its change. The main focus is to understand how physical processes helped form this environment and how the area has been subject to change in recent time.

In this section we will look at an example of a post-glaciated landscape that has been subject to change over time. The area in this study is the **Bethesda** area in Snowdonia National Park.

Besthesda is a small village along the A5, in the north fringe of Snowdonia National Park, just south of Caenarfon. It is historically famous for the large quarry, the Penrhyn Slate quarry, which is 1.6km long and approximately 370m deep.

The slate in this post-glaciated environment was formed when the area was under shallow seas. Slate is metamorphosed muds made up from clay minerals.

The metamorphosis happened as the area where Snowdonia National Park currently is underwent tectonic convergence causing it to get squashed and uplifted. This process meant that heat and pressure caused the clay minerals to metamorphose into slate. This was more recently exposed (last 10,000–18,000 years) by the action of glaciation in north-west Wales.

The Penrhyn Slate quarry at Bethesda opened in the 1780s and is one of the last remaining slate quarries in operation today. The blue slate mined here has been used mostly for roofing and, at the high point of production, 100,000s tonnes

were extracted in 20 different galleries. In the 1800s and early 1900s there were over 200 people employed here, however today there are less than 200.

Today the quarry has diversified away from slate mining and is now a tourist attraction, home to Europe's largest – and the world's fastest – zip wire, with speeds in excess of 100 mph. This post glacial landscape, although heavily scarred by the quarrying, has been used to develop tourist attractions. The environmental impact has been substantial.

Guidance on teaching option topic sections

The following may all be helpful:

- Use of OS maps and cross sections to understand different landforms.
- Use of weather data from the Met Office to understand the variation in rainfall across different locations where landforms are found.
- Photographic analysis of landforms and processes – use of photos to justify statements about landforms.
- Fieldwork activities visiting landscapes to understand spatial changes.
- Cartoon strips or flickbook creation of landforms to show the stages in landform development.
- Use of flashcards to link processes to landforms.

