

GLACIAL SYSTEMS AND LANDSCAPES (OPTION)

3.1.4.1 GLACIERS AS NATURAL SYSTEMS	R	A	G
Systems concepts and their application to the development of coastal landscapes – inputs, outputs, energy, stores/components, flows/transfers, positive/negative feedback, dynamic equilibrium			
The concepts of landform and landscape and how related landforms combine to form characteristic landscapes			
3.1.4.2 THE NATURE AND DISTRIBUTION OF COLD ENVIRONMENTS	R	A	G
The global distribution of cold environments			
Physical characteristics of cold environments: climate, soils and vegetation (and their interaction)			
The global distribution of past and present cold environments (polar, alpine, glacial and periglacial) and of areas affected by the Pleistocene glaciations			
3.1.4.3 SYSTEMS AND PROCESSES	R	A	G
Glacial systems including glacial budgets			
Ablation and accumulation – historical patterns of ice advance and retreat			
Warm and cold based glaciers: characteristics and development			
Geomorphological processes – weathering: frost action, nivation; ice movement: internal deformation, rotational, compressional, extensional and basal sliding; erosion: plucking, abrasion; transportation and deposition			
Fluvioglacial processes: meltwater, erosion, transportation and deposition			
Periglacial features and processes: permafrost, active layer and mass movement			
3.1.4.4 GLACIATED LANDSCAPE DEVELOPMENT (UK & BEYOND THE UK EXAMPLES)	R	A	G
Origin and development of glaciated landscapes			
Erosional and depositional landforms: corries, arêtes, glacial troughs, hanging valleys, truncated spurs, roches moutonnées. Characteristic glaciated landscapes			
Origin and development of landforms and landscapes of glacial deposition: drumlins, erratics, moraines, till plains. Characteristic glaciated landscapes			
Fluvioglacial landforms of erosion and deposition: meltwater channels, kames, eskers, outwash plains. Characteristic fluvioglacial landscapes			
Periglacial landforms: patterned ground, ice wedges, pingos, blockfields, solifluction, lobes, terracettes, thermokarst. Characteristic periglacial landscapes			
Relationship between process, time, landforms and landscapes in glaciated settings: characteristic glaciated and periglacial landscapes			

3.1.4.5 HUMAN IMPACTS ON COLD ENVIRONMENTS	R	A	G
Concept of environmental fragility. Human impacts on fragile cold environments over time and at a variety of scales			
Recent and prospective impact of climate change			
Management of cold environments at present and in alternative possible futures			
3.1.4.6 QUANTITATIVE AND QUALITATIVE SKILLS	R	A	G
Quantitative and relevant qualitative skills, applicable within the theme of landscape systems, including observation skills, measurement and geospatial mapping skills, and data manipulation and statistical skills applied to field measurements			
3.1.4.7 CASE STUDIES	R	A	G
Case study(ies) of glaciated environment(s) at a local scale to illustrate and analyse fundamental glacial processes, their landscape outcomes (as set out above) and engage with field data			
Case study of a contrasting glaciated landscape from beyond the UK to illustrate and analyse how it presents challenges and opportunities for human occupation and development			
Case study of a contrasting glaciated landscape from beyond the UK to illustrate and evaluate human responses of resilience, mitigation and adaptation			