

3.1.3 Coastal systems and landscapes

Assessment		Knowledge strands/links to previous learning		Homework/independent study	
Mini-tests will take place throughout each topic. Mini-mocks will take place throughout the unit on the following topics: <ul style="list-style-type: none"> Coastal systems and processes Coastal landscapes Coastal management 		Students will carry a good foundation knowledge from the study of coastal landscapes in the UK in their Geography GCSE.		Will be set each week by the class teacher. Tasks will include: <ul style="list-style-type: none"> Further reading Guided research into tourism sectors Guided writing practice 	
Specification content Week number	Subject-specific skills development	Learning outcomes	Suggested learning activities (including ref to differentiation and extension activities)	Resources	
Week 1 Systems in physical geography (If students have already studied the unit on Water and Carbon cycles, they should revisit the introductory section of that unit on 'Systems in Physical Geography' and then return to the end of this section to introduce 'Coasts as natural	Use of key subject specific and technical terminology. To identify connections and interrelationships between different aspects of geography. Constructing and using systems and	An overview of the concept and use of ' models ' by geographers as simplifications of a complex world. Understanding of the concept of ' systems frameworks ' as a type of model fundamental to most areas of geographical understanding. Students will be able to identify, describe and explain the elements of geographical systems, including: <ul style="list-style-type: none"> - stores/components 	Small group discussions followed by feedback - what models used in geography do students know? Students to draw and annotate a model system to show the key elements of a system. Students to draw and annotate a diagram showing an example of a positive	Introductory presentation on water and carbon cycles as natural systems Simple summaries of a number of earth systems A summary of the features of the lithosphere A summary of the features of the hydrosphere	

<p>systems'. If this is the first physical geography element studied, complete an introductory lesson covering the 'systems in physical geography' material outlined in this section)</p> <ul style="list-style-type: none"> • Systems in physical geography: 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. 	<p>models.</p> <p>Labelling and annotation of diagrams.</p>	<ul style="list-style-type: none"> - flows/connections - elements - attributes -relationships. <p>Students will be able to identify, describe and explain common characteristics of systems including:</p> <ul style="list-style-type: none"> - boundaries - inputs - outputs - flows. <p>Students will understand systems that are classified as:</p> <ul style="list-style-type: none"> - isolated systems - closed systems - open systems. <p>Students will understand systems as being in a state of dynamic equilibrium that includes:</p> <ul style="list-style-type: none"> - positive feedback - negative feedback. <p>Students will be able to identify the four major subsystems of the earth:</p> <ul style="list-style-type: none"> - atmosphere - lithosphere - hydrosphere - biosphere. <p>To understand that these are interlinked as a 'cascading system'.</p> <p>Coasts as natural systems Students will be able to identify coastal environments as open</p>	<p>feedback system and a negative feedback system.</p> <p>Repeat group discussion to see if students can now think of any more examples of systems in geography.</p> <p>Students to work in pairs/small groups to think of ways in which the four 'spheres' are interlinked, then feedback and share ideas.</p> <p>Opportunity here for a short research task for interconnections.</p> <p>Practice low-tariff exam questions to assess learning – peer assessment opportunity.</p>	<p>A summary of the features of the cryosphere plus further information about the cryosphere</p> <p>A summary of the features of the atmosphere</p> <p>An online lesson activity investigating connections in the atmosphere</p>
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		<p>systems.</p> <p>Students will be able to identify the different elements of a coastal system, including:</p> <ul style="list-style-type: none"> - inputs - components/stores - transfers/flows - outputs. <p>Students will be able to understand coastal landscapes as being in dynamic equilibrium that includes:</p> <ul style="list-style-type: none"> - positive feedback - negative feedback. <p>Coasts as characteristic landscapes</p> <p>Students will understand the concepts of:</p> <ul style="list-style-type: none"> - landform - landscape. <p>Students will appreciate that characteristic coastal landscapes are the combination of related landforms.</p>	<p>Small group discussion/Q&A to understand coasts as open systems.</p> <p>Construct and annotate a diagram to illustrate various elements of the coast as an open system.</p> <p>Paired/small group task to identify examples of positive and negative feedback in coastal landscapes.</p> <p>Students to draw and annotate a diagram showing an example of a positive or negative feedback in a coastal landscape.</p> <p>Once all students have illustrated one example of feedback at the coast, there is the opportunity for individuals/small groups to research for others.</p> <p>Small group discussion to identify prior knowledge of coastal landforms.</p> <p>Discuss what represents a characteristic coastal landscape.</p> <p>(Specific landforms and landscapes are studied in detail later.)</p>	
<p>Weeks 2-3 Systems and processes</p>	<p>Use of key subject specific and technical</p>	<p>Students will be able to identify different zones of the coastline, to</p>	<p>Construct a diagram to illustrate the different coastal</p>	<p>There are a huge range of resources online covering all aspects of coastal processes</p>

<ul style="list-style-type: none"> • Sources of energy in coastal environments: winds, waves (constructive and destructive), currents and tides. Low energy and high energy coasts. • Sediment sources, cells and budgets. • Geomorphological processes: weathering, mass movement, erosion, transportation and deposition. • Distinctively coastal processes: marine: erosion – hydraulic action, wave quarrying, corrosion/abrasion, cavitation, solution, attrition; transportation: traction, suspension (longshore/littoral drift) and deposition; sub-aerial weathering, mass movement and run off. 	<p>terminology.</p> <p>Opportunities to develop skills such as drawing, labelling and annotating diagrams.</p> <p>Opportunity to measure/study characteristics of waves and other coastal processes including erosion, transportation, deposition and weathering.</p> <p>Handling primary and secondary sources of data.</p> <p>Online research.</p> <p>Constructing and interpreting a range of graphical and statistical techniques.</p> <p>Using a range of maps to identify coastal features.</p> <p>Opportunity to apply systems theory to identify the inputs, processes, and outputs operating at the coastal zone.</p>	<p>include:</p> <ul style="list-style-type: none"> - backshore - foreshore - inshore - offshore - nearshore - swash zone - surf zone - breaker zone. <p>Students will be able to identify, and analyse the characteristics of the sources of energy in a coastal system, including:</p> <ul style="list-style-type: none"> - wind - waves - tides - sea currents. <p>Students will be able to identify the sources of sediment for the coastal system, including:</p> <ul style="list-style-type: none"> - rivers and streams reaching the coast - estuaries - cliff erosion - offshore sand banks - material from a biological origin. <p>Students identify the features of coastal sediment cells – to understand these using a systems approach.</p> <p>Understanding of the concept of the coastal sediment budget, including:</p> <ul style="list-style-type: none"> - positive budgets - negative budgets. <p>To explore these using a systems</p>	<p>zones.</p> <p>Paired/small group discussion to identify sources of energy at the coast.</p> <p>Students to explore energy at the coast including:</p> <ul style="list-style-type: none"> - Wind - idea of fetch, and global pattern of major winds – opportunity to study atlas maps to identify coasts exposed to large and small fetch - Waves – discuss the characteristics of waves. Opportunity to use the internet, text or VLE resources to research the characteristics of waves. Construct diagrams of the characteristics of waves. - Research constructive and destructive waves – annotate photographs and diagrams to identify characteristics. - Use atlas or internet maps to produce a map of ocean currents, accompanied by video notes to describe/explain the pattern of ocean currents. - Discuss different types of ocean currents in the coastal zone. - Q&A/group discussion about tides. Following short explanatory video, 	<p>especially erosion and weathering. Some examples are given below:</p> <p>Summary of fetch and the effect of wind</p> <p>Interactive map of current surface winds</p> <p>Summary of wave formation</p> <p>Video explanation of many aspects of the features of waves</p> <p>Simple map of major ocean currents</p> <p>Exploration of the causes and effects of surface ocean currents</p> <p>Exploration of ocean currents in coastal areas</p> <p>Detailed video explanation of ocean</p>
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		<p>approach.</p> <p>Students will understand that coastlines are affected by two main sets of geomorphological processes:</p> <ul style="list-style-type: none"> - marine processes, including: <ul style="list-style-type: none"> o marine erosion – hydraulic action; Wave quarrying; abrasion/corrasion; attrition; contribution of solution/corrosion o marine transportation – traction; saltation; suspension; solution; longshore/littoral drift o marine and aeolian deposition - Sub-aerial processes, including <ul style="list-style-type: none"> o sub-aerial weathering – mechanical/physical; biological; chemical o mass movement – landslides; rock falls; mudflows; rotational slip/ slumping o run-off. 	<p>construct annotated diagrams to illustrate high and low tides, neap and spring tides, and the role of the alignment of earth, moon and sun.</p> <ul style="list-style-type: none"> - Research opportunity to find out about high and low energy coasts – possibly produce a short presentation/poster information sheet/electronic resource about each and identify an illustrative example of each. - Q&A/paired discussion about where coastal sediment comes from. <p>Following an introduction to sediment cells, research the sediment cells and sub cells of England and Wales - identify these on an outline map, then identify and map the characteristics of the most local cell. Draw simple flow diagrams to illustrate the concepts of a positive and negative sediment budget.</p> <p>Practice low-tariff exam questions to assess learning – peer assessment opportunity.</p> <p>Q&A/paired discussion – how</p>	<p>currents</p> <p>3 minute video on “motion in the ocean” covering tides and ocean currents</p> <p>Detailed video exploring tides, with links to activities and other information about tides</p> <p>A summary of wave characteristics, including high and low energy coastlines</p> <p>Short video on ‘where coastal sediment comes from’</p> <p>US Geological Survey information on sediment cells and budgets</p> <p>There is a Geofile article with a good summary of coastal systems including sediment cells.</p> <p>Maps of the sediment cells of England and Wales are easy to find online.</p> <p>US Geological Survey information on coastal land loss and sediment budgets</p> <p>Video introduction to processes of coastal erosion</p> <p>Brief summary of a range of coastal processes including a short video clip illustrating fluvial transport</p>
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			<p>affecting the coast. The outcome could be a written report, revision notes, video presentation to go on a VLE, large poster/information sheet, model answers to sample exam questions on the topic. Also give named illustrative examples of places where the processes are occurring (not extended case studies).</p> <p>Again there are opportunities to visit a local coast and investigate which are the dominant weathering processes and why.</p>	<p>processes including weathering and mass movement.</p>
<p>Weeks 4-5 Coastal landscape development</p> <p>This content must include study of a variety of landscapes from beyond the United Kingdom (UK) but may also include UK examples.</p> <ul style="list-style-type: none"> • Origin and development of landforms and landscapes of coastal erosion: Cliffs and wave cut platforms, cliff profile features including caves, arches and stacks; factors and processes in their development. 	<p>Use of key subject specific and technical terminology.</p> <p>Develop knowledge and understanding of a range of related landforms that combine to form distinctive coastal landscapes.</p> <p>To identify connections and interrelationships between different aspects of geography.</p> <p>Opportunities to</p>	<p>Students will revisit the idea of distinctive coastal landscapes resulting from a combination of related landforms.</p> <p>Students will be able to describe the characteristics and analyse the factors and processes in the development of landforms and landscapes of coastal erosion, including:</p> <ul style="list-style-type: none"> - cliffs and wave cut platforms - cliff profile features – caves, arches and stacks. <p>Students will be able to describe the characteristics and analyse the factors and processes in the development of landforms and</p>	<p>Q&A/discussion to define ‘landforms’ and ‘landscapes’.</p> <p>For each erosional landform listed in the specification, use a range of resources to produce a revision card/sheet (or electronic resource). To include:</p> <ul style="list-style-type: none"> - annotated sketch/diagram showing its characteristics - a flow diagram giving a sequenced explanation of formation – explaining processes in their development. - factors affecting their formation 	<p>Simple resources about various aspects of the coast with many effective images and a range of video clips and diagrams</p> <p>Video clip discussing factors affecting coastal erosion and resultant landforms</p> <p>How erosional landforms are linked with the impacts of climate change</p> <p>Coastal erosion is widely covered in a range of paper or online resources.</p> <p>Video presentation of the effects of coastal erosion including animations of erosional features</p> <p>British Geological Society’s case studies of</p>

<ul style="list-style-type: none"> • Origin and development of landforms and landscapes of coastal deposition. Beaches, simple and compound spits, tombolos, offshore bars, barrier beaches and islands and sand dunes; factors and processes in their development. • Estuarine mudflat/saltmarsh environments and associated landscapes; factors and processes in their development. • Eustatic, isostatic and tectonic sea level change: major changes in sea level in the last 10,000 years. • Coastlines of emergence and submergence. Origin and development of associated landforms: raised beaches, marine platforms; rias, fjords, Dalmatian coasts. • Recent and predicted climatic change and potential impact on coasts. • The relationship between process, time, landforms and landscapes in coastal settings. 	<p>develop skills such as drawing, labelling and annotating diagrams.</p> <p>Opportunity to analyse and present geographical data employing a variety of graphical techniques and descriptive statistics (see skills checklist).</p> <p>Opportunity to use a range of sources of information to research the impacts of recent and predicted sea level change on coasts.</p> <p>Opportunity to construct arguments about the impacts of climate change and come to valid conclusions.</p>	<p>landscapes of coastal deposition, including:</p> <ul style="list-style-type: none"> - beaches - simple and compound spits - tombolos - offshore bars - barrier beaches and islands - sand dunes. <p>Students will be able to describe the characteristics and analyse the factors and processes in the development of estuarine mudflat/saltmarsh environments and associated landscapes.</p> <p>Students will understand the causes and impacts of eustatic, isostatic and tectonic sea level change, especially major changes in sea level in the last 10,000 years.</p> <p>Students will be able to describe the characteristics and analyse the factors and processes in the development of landforms of coastlines of emergence and submergence, including:</p> <ul style="list-style-type: none"> - raised beaches and marine platforms - rias, fjords and Dalmatian coasts. <p>Understanding of the nature and causes of recent and predicted climate change and the potential impact on coasts.</p> <p>Students will explore the relationship between process,</p>	<ul style="list-style-type: none"> - reference to inputs, processes and outputs of erosional coastal landscapes - a named illustrative example (not developed case study) from a local UK area and one from beyond the UK - a summary of the timescales involved in the formation of the landforms. <p>Identify an area of the coast dominated by coastal erosion and the individual landforms that have combined to form the distinctive landscape they see. (There is an opportunity to investigate landforms/landscapes in the field.)</p> <p>For each depositional landform listed in the specification students should follow the same approach as above and use a range of resources to produce a revision card/sheet (or electronic resource).</p> <p>Then identify an area of the coast dominated by deposition and identify the individual landforms that have combined to form the distinctive landscape they</p>	<p>coastlines affected by erosion with interesting information and images</p> <p>Coastal deposition is widely covered in a range of paper or online resources.</p> <p>Summary of some depositional features</p> <p>Information on coastal deposition with in-depth text and interesting images and photos</p> <p>There is a good <i>Geo Factsheet</i> on coastal deposition.</p> <p>Videos on coastal sand dunes and sand dune formation</p>
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		<p>time, landforms and landscapes in coastal settings.</p>	<p>see. (There is an opportunity to investigate landforms/landscapes in the field).</p> <p>For each of estuarine mudflats and saltmarsh environments students should follow the same approach as above and use a range of resources to produce a revision card/sheet (or electronic resource).</p> <p>A named illustrative example (not developed case study) from a local UK area and one from beyond the UK - identify an area of mudflats and saltmarsh and identify the individual features that have combined to form the distinctive landscape they see.</p> <p>Opportunities to assess all aspects with a full range of exam style questions, including peer assessment.</p> <p>Q&A/group discussion – what are the reasons for sea level rising and falling? What are the reasons for global and more localized changes in sea level?</p> <p>Establish full definitions of ‘eustatic’ and ‘Isostatic’ sea</p>	<p>Estuarine mudflats in Pembrokeshire</p> <p>Background information on mudflats</p> <p>Summary of saltmarshes</p> <p>Simple animation illustrating the locational relationship between mudflats and saltmarshes</p> <p>Video of estuarine environments in Cardigan Bay in west Wales</p> <p>Estuarine environment beyond the UK: saltmarshes in the USA</p> <p>Videos giving aerial views of estuarine mudflat and salt marsh landscapes at Morecambe Bay.</p> <p>Summary of causes of sea level change: good images to explain change and sea levels through recent geological time</p> <p>Video animation of sea level change around the British Isles in the last 12,000 years – plays in QuickTime</p> <p>Summary of coastline features with good</p>
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			<p>level change, and the role played by tectonic processes.</p> <p>Opportunities to use a range of resources to map and understand changes in sea level throughout the last 10,000 years.</p> <p>Opportunity to research the British coastline to identify examples of emergent and submergent sections of coast.</p> <p>For each submergent and emergent landform listed in the specification follow the same approach as above and use a range of resources to produce a revision card/sheet (or electronic resource).</p> <p>Then identify an area of the coast dominated by deposition and identify the individual landforms that have combined to form the distinctive landscape they see. (There is an opportunity to investigate landforms/landscapes in the field.)</p> <p>Opportunity for a group research task – students given/find a range of resources on predicted future sea level rise.</p> <p>Questions could include:</p>	<p>diagrams and images– including emergent and submergent features</p> <p>Short video about fjords</p> <p>National Geographic encyclopedia entry on fjords</p> <p>Open University video on forming fjords</p> <p>Information on raised beaches/marine terraces.</p> <p>WizScience video on marine terraces</p> <p>The Geological Society information on the raised beach at Loch Tarbert</p> <p>Intergovernmental Panel on Climate Change (IPCC) videos on climate change: 2013 video provides good general</p>
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<p>Weeks 6-7 Coastal management Human intervention in coastal landscapes.</p> <ul style="list-style-type: none"> • Traditional approaches to coastal flood and erosion risk: hard and soft engineering. • Sustainable approaches to coastal flood risk and coastal erosion management: shoreline management/integrated coastal zone management. 	<p>Use of key subject specific and technical terminology.</p> <p>Opportunity to conduct fieldwork to investigate the characteristics and effectiveness of different approaches to coastal management.</p> <p>Online research.</p> <p>Handling primary and secondary sources of data.</p> <p>Construct and</p>	<p>Students will be able to understand why people manage different coastlines in different ways.</p> <p>Students will be able to identify and describe traditional approaches to coastal flood risk and coastal erosion, including:</p> <ul style="list-style-type: none"> - hard engineering – sea walls; rock armour/rip rap; gabions; revetments; groynes; cliff fixing; offshore reefs; barrages - soft engineering – beach nourishment; dune regeneration; managed retreat; land-use management; ‘Do nothing’. 	<p>Paired/small group discussion with feedback/snowballing to the group as a whole.</p> <p>Possible questions include:</p> <ul style="list-style-type: none"> - Why should people manage the coastline? - Why might some stretches of coastline be managed differently? - What techniques could be used to manage different coastlines? <p>Having studied a range of hard and soft engineering strategies (this is well</p>	<p>Coastal management, and hard and soft engineering approaches are topics that are well resourced in books and online - a sample of resources below:</p> <p>Fieldwork Studies Council summary of approaches to coastal management strategies and different approaches available, with reference to fieldwork opportunities.</p> <p>Summary article on some coastal management approaches</p> <p>Strategies used along one stretch of coastline at Pevensey Bay in East Sussex</p>

			<p>Century, including Shoreline Management Plans. Possible tasks include:</p> <ul style="list-style-type: none"> - research the background to SMPs - identify how the British coastline is separated into SMPs - identify the key aims and features of SMPs - produce a mini-illustrative example of the features of the SMP most local to them. <p>Opportunity to conduct research into Integrated Coastal Zone Management (ICZM). Possible questions include:</p> <ul style="list-style-type: none"> - What are the origins of ICZM? - What is the background to why an integrated coastal management is needed? - Why is concentrating on people and economic activity putting pressure on coastal environments? - What are the specific issues facing coastal environments in the future? - Who are the stakeholders, who should be considered when thinking about coastal management? - How can ICZM be viewed 	<p>UK government information on how the Environment Agency and local councils are developing shoreline management plans to manage the threat of coastal change</p> <p>What is a Shoreline Management Plan?</p> <p>It is quite easy to find information about each of the SMP areas online like the last resource for the Southeast Coastal Group.</p> <p>20min interview with Dr. Burbridge from Newcastle University on Integrated Coastal Zone Management</p> <p>European Commission information on ICZM</p> <p>Summary of the importance of ICZM for planning in the UK</p> <p>European Commission presentation on ICZM and Maritime Spatial Planning with useful summary diagrams</p> <p>Summary of the origin of the concept and policies of ICZM</p>
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			<p>as a cyclical process?</p> <p>Opportunity to research the local ICZM plan for a local coastline.</p> <p>Opportunities to assess all aspects with a full range of exam style questions, including peer assessment – also skills and fieldwork assessment.</p>	
<p>Weeks 8-9 Case study 1 Case study(ies) of coastal environment(s) at a local scale to illustrate and analyse fundamental coastal processes, their landscape outcomes as set out above and engage with field data and challenges represented in their sustainable management.</p>	<p>Collect, analyse and interpret a range of qualitative and quantitative data from a range of primary and secondary sources – this could include discursive/creative material when looking at the experiences of people in place.</p> <p>Present, analyse, draw conclusions and evaluate those findings using a range of geographical techniques (see skills checklist).</p>	<p>Students could either study a local coastal landscape through the use of secondary data sources (including online digital mapping, secondary data, local authority websites and text book resources) or engage first hand or complete fieldwork to collect primary data, or a combination of both.</p> <p>The aims of such work are to:</p> <ul style="list-style-type: none"> - illustrate how the coastal landscape is distinctive and is the unique combination of the processes and environmental characteristics that created it at a local scale - to investigate and understand how the combination of local coastal processes and landscape features present specific challenges for sustainable management. <p>If students complete a fieldwork investigation, they will be able to follow through a complete</p>	<p>An opportunity to create a ‘virtual fieldwork investigation’ and provide a range of data relating to a local coastal environment for students to investigate and address the themes of the enquiry.</p> <p>Or, an opportunity for students to conduct a short fieldwork enquiry of a local coastal environment to investigate the main themes of the lesson. Students could write-up a mini-fieldwork enquiry to act as a case study of a local coastal environment.</p> <p>(This could feed into the completion of coursework for the Non-examination assessment element of the specification).</p>	<p>Many of the accompanying textbooks will have illustrative examples of possible coastal fieldwork opportunities and other guidance may be found below.</p> <p>RGS guidance on coastal investigation</p> <p>RGS guidance on fieldwork techniques</p> <p>Field Studies Council guidance on coastal fieldwork</p>

<p>Case study 2 Case study of a contrasting coastal landscape beyond the UK to illustrate and analyse how it presents risks and opportunities for human occupation and development and evaluate human responses of resilience, mitigation and adaption.</p>	<p>Collect, analyse and interpret a range of qualitative and quantitative data from a range of primary and secondary sources – this could include discursive/creative material when looking at the experiences of people in place.</p>	<p>geographical investigation and route to enquiry.</p> <p>This example is based on an investigation of the Sundarbans region of Bangladesh.</p> <p>Students will be able to describe, analyse and evaluate a range of themes relating to how the human population of the Sundarbans interacts with their coastal landscape, including:</p> <ul style="list-style-type: none"> - an understanding of the coastal processes that combined to create this unique coastal landscape - the challenges and risks of living in the Sundarbans - the opportunities offered by living in the Sundarbans - the human response to the challenges of the Sundarbans, including strategies aimed at resilience, mitigation and adaptation - the potential for possible sustainable development in the future for the people of the Sundarbans. 	<p>Opportunity for individual, paired or group research task, using a range of textual, digital or audiovisual resources. Findings could be shared in traditional classroom approaches or shared through a VLE on a blog for example.</p> <p>For a more active learning approach students could research from the point of view of different stakeholders. Feedback could then take the form of a debate/roleplay or construction of SWOT analysis in groups etc.</p>	<p>Information is readily available about the Sundarbans, but a selection is given below:</p> <p>Overview information of the Sundarbans</p> <p>Welcome to the Sundarbans</p> <p>Encyclopedia of Earth</p> <p>US Aid information on the environment and global climate change</p>
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Quantitative and qualitative skills

Students must engage with a range of quantitative and relevant qualitative skills, within the theme landscape systems. These should include observation skills, measurement and geospatial mapping skills and data manipulation and statistical skills applied to field measurements.

Making connections

Students must consider connections across the themes within the theme of coastal systems and landscapes, connections between this and other themes in the specification and connections with novel geographical themes beyond the specification.