

Scheme of work

Physical geography: Ecosystems under stress

This resource is a scheme of work for our accredited AS and A-level Geography specifications (7036, 7037). This scheme of work is not exhaustive or prescriptive, it is designed to suggest activities and resources that you might find useful in your teaching.

3.1 Physical geography

Physical option

3.1.6 Ecosystems under stress

Specification content Week number	Subject-specific skills development	Learning outcomes	Suggested learning activities (including ref to differentiation and extension activities)	Resources
Week 1 Ecosystems and sustainability <ul style="list-style-type: none"> The concept of biodiversity. Local and global trends in biodiversity. Causes, rates and potential impacts of declining biodiversity. Ecosystems and their importance for human 	Use of key subject-specific and technical terminology. To identify connections and interrelationships between different aspects of geography. Labelling and annotation of diagrams.	Students to have an overview of the concept of the terms ' biodiversity ', ' ecosystems ' and ' sustainability ' as used by geographers. Students will become familiar with terms including: <ul style="list-style-type: none"> biological diversity measuring biodiversity - indicator species, species richness, living planet index trends in biodiversity – global trends, mass extinctions, factors contributing to changing 	Small group discussion/Q&A followed by feedback – what does the term biodiversity mean? Students to use textbooks, library or the internet to identify local and global trends in biodiversity. Causes, rates and potential impacts of declining biodiversity. Small group discussion/Q&A	The concept of biodiversity: <ol style="list-style-type: none"> 1: What is Biodiversity? 2: Biodiversity: Concepts, types and other details 3: Definition of Biodiversity Short TED talks video clip and lesson 'Why is biodiversity so important?' Trends in biodiversity: (includes links to other useful resources , including data and maps and some teaching ideas)

<p>populations in the light of continuing population growth and economic development. Human populations in ecosystem development and sustainability.</p>	<p>Identifying, finding and using a variety of sources of geographical information.</p> <p>Using models in geography.</p> <p>Research skills.</p> <p>Report writing.</p> <p>Group work.</p>	<p>biodiversity.</p> <p>Students will be able to evaluate the importance of ecosystems for human populations, especially in the context of:</p> <ul style="list-style-type: none"> - population growth - economic development. <p>This may include the concepts of:</p> <ul style="list-style-type: none"> - ecosystem services – provisioning services, regulating services, supporting services, cultural services - wellbeing – security, basic material for good life, health, good social relations. <p>Students will also be able to assess the role of humans in the development of ecosystems and their future sustainability.</p> <ul style="list-style-type: none"> - Including scenarios that could result from human population growth and climate change. This could provide an opportunity to explore situations resulting from both: <ul style="list-style-type: none"> • negative feedback loops • positive feedback loops. 	<p>followed by feedback – what is meant by the term ecosystem?</p> <p>Class to discuss:</p> <ul style="list-style-type: none"> - the importance of ecosystems for human populations - potential impacts of population growth and economic develop - the role played by humans in ecosystem development and sustainability. <p>Opportunity for an individual or group research task into the following in the context of ecosystems and their importance for human populations:</p> <ul style="list-style-type: none"> - population growth - economic development - ecosystem services – provisioning services, regulating services, supporting services, cultural services - wellbeing – security, basic material for good life, health, good social relations. <p>Opportunity for group activity to explore different scenarios that could result from human population growth and climate change. This could provide an</p>	<p>(Biodiversity chapter from United Nations Environment Programme report)</p> <p>(with links to journal articles in the ‘Resources’ section.</p> <p>Causes and impacts of declining biodiversity: (many links to extra useful information on biodiversity)</p> <p>another link on biodiversity (with links to some interesting graphics)</p> <p>Ecosystems, population growth and sustainable development: Ecosystem change Human population and consumption: what are the ecological limits? Human population growth Ecosystems and their services UNEP report – ecosystems and human well-being Ecosystems and human health - Millennium Ecosystem Assessment – Ecosystems and Human Health Sustainability - Environment and Ecology – Sustainability Ecological balance WWF – Ecological Balance</p> <p>The Habitable Planet: A systems approach to Environmental Science - links to documentary length videos about related issues. 5 Impacts on the environment – ‘Crash Course’ video introducing ecological issues.</p>
--	---	---	--	---

			<p>opportunity to explore situations resulting from both. Students could create negative and positive feedback diagrams.</p> <p>Ensure students have definitions of key terms used so far.</p> <p>All of the above provide opportunity for an independent research task. Students given a brief to research and create a short report on the key ideas relating to the concepts of biodiversity and ecosystems.</p> <p>Various opportunities above to assess learning with a range of exam-style questions and peer assessment.</p>	
<p>Week 2-3 Ecosystems and processes</p> <ul style="list-style-type: none"> Nature of ecosystems – their structure, energy flows, trophic levels, food chains and food webs. Application of systems concepts to ecosystems – inputs, outputs, stores and transfers of energy and materials. Concepts of biomass and net 	<p>Use of key subject-specific and technical terminology.</p> <p>Opportunities to develop skills such as drawing, labelling and annotating diagrams.</p> <p>Online research into ecosystems and processes.</p> <p>Construct and</p>	<p>Students will understand the nature of ecosystems, including:</p> <ul style="list-style-type: none"> - their structure – the two main components: <ul style="list-style-type: none"> • abiotic components – such as rain, wind, temperature, altitude, soil, pollution, nutrients, pH, types of soil, sunlight • biotic components – producers, consumers, decomposers. - energy flows – ecosystems as open systems (see below) 	<p>Opportunity to construct a range of diagrams to illustrate the nature of ecosystems including:</p> <ul style="list-style-type: none"> - their structure - energy flows - trophic levels - food chains - food webs. <p>Opportunity to use a range of exam question types and peer assessment for students to test their understanding of</p>	<p>The nature of ecosystems: The concept of the ecosystem Ecosystem ecology The nature of ecosystems</p> <p>Structure of ecosystems: Ecosystem structure and function Ecosystems: Concept, structure and functions of ecosystems</p> <p>Ecosystems – energy flows: Energy flow through ecosystems Energy flow in an ecosystem Ecosystem energy flow</p>

<p>primary production.</p> <ul style="list-style-type: none"> • Concepts of succession: seral stages, climatic climax, sub-climax and plagioclimax. • Mineral nutrient cycling. • Nature of terrestrial ecosystems and the inter-connections between climate, vegetation, soil and topography which produce them. Ecosystem responses to changes in one or more of their components or environmental controls. • Factors influencing the changing of ecosystems, including climate change and human exploitation of the global environment. 	<p>annotate a range of graphs and use statistical skills.</p> <p>Developing extended writing skills.</p> <p>Using atlas maps.</p> <p>Producing annotated maps.</p> <p>Practising exam-style questions. Including the use of peer assessment.</p> <p>Conducting independent and group research tasks.</p> <p>Making links within, across and beyond this area of the specification.</p> <p>Report writing.</p>	<ul style="list-style-type: none"> - trophic levels - food chains - food webs. <p>Students will understand the application of systems concepts to ecosystem, including:</p> <ul style="list-style-type: none"> - inputs – Sun (solar radiation), plants (dispersal), animals (migration), Soil organic matter (erosion/deposition) - outputs – longwave radiation, heat, dispersal of plants, migration of animals, erosion/leaching of soil organic matter - stores and transfers of energy and materials – including ideas such as photosynthesis, biomass, consumption, decomposition, maintenance, respiration, heat transfers and outputs. <p>Students will understand the concepts of:</p> <ul style="list-style-type: none"> - biomass in an ecosystem – community biomass; amount of one species; decaying material - net primary productivity - including the ideas of primary productivity and of gross primary productivity. <p>Students will be able to evaluate the concept of succession, including:</p> <ul style="list-style-type: none"> - seral stages - climatic climax - sub-climax 	<p>each of the above.</p> <p>Paired/small group discussion to identify the inputs, outputs and stores and transfers in ecosystems.</p> <p>Opportunity for students to use textbook, library or internet resources to help produce a generic systems diagram to illustrate the inputs and outputs of a typical ecosystem. They should also construct a diagram to illustrate the generalised energy flow and heat loss through an ecosystem.</p> <p>Students to research the concepts of biomass and net primary productivity.</p> <p>Students to explore the concept of succession, including:</p> <ul style="list-style-type: none"> - seral stages - climatic climax - sub-climax - plagioclimax. <p>This may involve the production of a traditional set of revision notes.</p> <p>Small group research task to explore the role of mineral nutrient cycling in ecosystems. Including the nature of nutrient transfers –</p>	<p>Trophic levels and food webs: National Geographic: Food web Video: What are trophic levels? Video: Ecosystem Ecology: Links in the chain</p> <p>Systems and energy flows: Food webs and ecosystem interactions Video: Energy flows in Ecosystems</p> <p>Net primary production: Primary production to higher trophic levels NASA: Net primary productivity interesting NASA animation of Net Primary Productivity Primary productivity of plants</p> <p>Succession: Science clarified: Succession Plant succession Video: Ecological succession Bozeman science video clip Video: Ecological succession CrashCourse video clip Succession in ecosystems</p> <p>Mineral nutrient cycles: International Plant Nutrition Institute: Generalised nutrient cycles</p> <p>Terrestrial ecosystems: The Nature Education: Terrestrial Biomes EPA: Climate impacts on ecosystems NASA article: Climate change may bring big ecosystem changes</p> <p>Human exploitation of ecosystems: Ecosystem change Powerpoint presentation: Human impacts Action bioscience: Population and the</p>
---	---	--	---	--

		<p>- plagioclimax.</p> <p>Students will be able to evaluate the role of mineral nutrient cycling in ecosystems. Including the nature of nutrient transfers between the different nutrient stores:</p> <ul style="list-style-type: none"> - soil, litter and biomass. <p>Students will be able to analyse and evaluate the inter-connections between climate, vegetation, soil and topography and the characteristic terrestrial ecosystem they produce. Students will be able to assess how the terrestrial ecosystem responds to changes in one or more of their components or environmental controls.</p> <p>Students will be able to analyse and evaluate a range of factors influencing the changing of ecosystems, including:</p> <ul style="list-style-type: none"> - climate change and human exploitation of the global environment – elements may include: <ul style="list-style-type: none"> • urban planning • trade • resources use • rural land use • leisure and recreation • marine management • flood and erosion management • catchment management. 	<p>students to produce a set of revision notes and construct a diagram to illustrate a model of the mineral nutrient cycle.</p> <p>When exploring the nature of terrestrial ecosystems and the inter-connections between climate, vegetation, soil and topography that shape them, and assessing how the terrestrial ecosystem responds to changes in one or more of their components or environmental controls. There is an opportunity for students to complete a research task into one specific ecosystem such as chalk downlands, leading to the production of a short report, research sheet, set of revision notes or electronic presentation.</p> <p>Small group/paired discussion to identify a range of factors influencing the changing of ecosystems.</p> <p>Opportunity for small group research task into factors influencing the changing of ecosystems. Each individual to research one element (from below) and findings shared with the rest of the</p>	<p>environment - the global challenge UN: Global issues - environment</p>
--	--	---	---	--

			<p>group:</p> <ul style="list-style-type: none"> - urban planning - trade - resources use - rural land use - leisure and recreation - marine management - flood and erosion management - catchment management. <p>Opportunity to use a range of practice exam questions to assess learning.</p>	
<p>Week 3-4 Biomes</p> <ul style="list-style-type: none"> • The concept of the biome. The global distribution of major terrestrial biomes. • The nature of two contrasting biomes: tropical rainforest and savanna grassland to include: <ul style="list-style-type: none"> - the main characteristics of each biome - ecological response to the climate, soil and soil moisture budget – adaptations by flora and fauna - human activity and its impact on each biome - typical development issues in each biome to include changes in 	<p>Use of key subject-specific and technical terminology.</p> <p>Opportunities to develop skills such as drawing, labelling and annotating diagrams.</p> <p>Online research into biomes.</p> <p>Construct a range of graphs and use statistical skills.</p> <p>Developing extended writing skills.</p> <p>Using atlas maps.</p> <p>Producing annotated maps.</p> <p>Practising exam style questions. Including the use of peer</p>	<p>Students will understand the concept of the biome. Including the factors that lead to their overall character, including:</p> <ul style="list-style-type: none"> - climate - topography - soil - plant and animal life - ecosystem functioning. <p>Students will be able to analyse and evaluate the global distribution of major terrestrial biomes.</p> <p>Students will be able to analyse and evaluate the nature of two contrasting biomes – tropical rainforest and savanna grassland.</p> <p>Analysis and evaluation of the following:</p> <ul style="list-style-type: none"> - The main characteristics of each biome - Ecological response to the climate, soil and soil moisture budget – adaptations by flora and 	<p>Small group discussion/Q&A – what is a biome?</p> <p>Students to find a map of the distribution of the major biomes/vegetation zones of the world. Paired discussion followed by annotation of map to try and identify factors affecting this distribution.</p> <p>Ensure students understand that the nature of a biome is influenced by:</p> <ul style="list-style-type: none"> - climate - topography - soil - plant and animal life - ecosystem functioning. <p>Students should reflect on how they have completed previous geographical research, then be given clear instructions and guidance</p>	<p>The concept of biome;</p> <p>National Geographic: Biome encyclopedic entry</p> <p>Science clarified: Biomes</p> <p>Difference between a biome and an ecosystem</p> <p>Terrestrial biomes:</p> <p>The world's biomes</p> <p>Major biomes of the world</p> <p>5 major world biomes</p> <p>Video: Biomes of the world introductory video</p> <p>Tropical rainforests:</p> <p>Tropical rainforest</p> <p>NASA: Rainforest</p> <p>What are the threats to the rainforests? - development issues</p> <p>Human impacts</p> <p>Savanna grassland:</p> <p>Tropical rainforest biome</p> <p>The grassland biome</p> <p>National Geographic: Grasslands</p>

<p>population, economic development, agricultural extension and intensification, implications for biodiversity and sustainability.</p>	<p>assessment. Conducting independent and group research tasks. Making links within, across and beyond this area of the specification. Engage with remotely sensed satellite data.</p>	<p>fauna - Human activity and its impact on each biome - Typical development issues in each biome to include changes in population, economic development, agricultural extension and intensification, implications for biodiversity and sustainability.</p>	<p>about creating a detailed study of two contrasting biomes – tropical rainforest and savanna grassland. To include the themes listed in the previous column. Student should be encouraged to be creative in the method used to present their findings. These could be traditional reports, revision sheets, mind maps, or electronic presentations to share on a VLE. But as a guide it should include the information listed in previous column. (There are opportunities for students to work together, or independently.) Also opportunities for discussion and debate of the issues involved. Opportunity to use a range of practice exam questions to assess learning.</p>	<p>Tropical savanna - with introductory video Threats to savanna grasslands - development issues Human impact on the grasslands WWF: Grasslands - summary Convention on Biological Diversity: Sustainable use of biodiversity</p>
<p>Week 5-6 Ecosystems in the British Isles over time</p> <ul style="list-style-type: none"> Succession and climatic climax as illustrated by lithoseres and hydroseres. The characteristics of the climatic climax: temperate deciduous 	<p>Use of key subject specific and technical terminology. Opportunities to develop skills such as drawing, labelling and annotating diagrams. Online research into ecosystems in the</p>	<p>Students will be able to analyse and evaluate the succession and climatic climax of a lithosere ecosystem in the British Isles. Any ecosystem in the British Isles which starts on a bare rock surface, eg recently glaciated landscape, cliff, quarry, scree slope, exposed rocky coastline. Students may address the following:</p>	<p>Q&A/small group discussion – what is the meant by succession and climatic climax? Students to use a range of textbook, library and internet resources to research the succession and climatic climax in lithoseres and hydroseres. Including the</p>	<p>Biogeography: Ecosystems on all scales climatic climax in the British Isles Natural England: Lowland calcareous grassland Chalk downland succession British Isles Dacorum: Biodiversity action plan for Hertfordshire Chalk Downlands Wetland example of succession in action Hydrosere succession Fieldwork ideas FSC hydrosere fieldwork</p>

<p>woodland biome.</p> <ul style="list-style-type: none"> The effects of human activity on succession – illustrated by one plagioclimax such as a heather moorland. 	<p>British Isles over time.</p> <p>Construct and a range of graphs and use statistical skills.</p> <p>Developing extended writing skills.</p> <p>Using atlas maps.</p> <p>Producing annotated maps.</p> <p>Practising exam style questions. Including the use of peer assessment.</p> <p>Conducting independent and group research tasks.</p> <p>Making links within, across and beyond this area of the specification.</p> <p>Engage with remotely sensed satellite data.</p>	<ul style="list-style-type: none"> - dominant ecological problems including aridity and the soilless surface - extremely slow soil formation - colonisation and successive plant cover of lichen, mosses, grasses and shrubs - hydrolysis and chelation as the main weathering processes to help soil formation and liberate nutrients for further development and succession - subsequent arrival of soil fauna and micro-organisms which speed up the rate of soil formation. <p>(Specific detail will depend on the chosen ecosystem.)</p> <p>Students will be able to analyse and evaluate the succession and climatic climax of a hydrosere ecosystem in the British Isles. Any ecosystem in the British Isles which starts in a freshwater lake or pool. Students may address the following:</p> <ul style="list-style-type: none"> - the early colonization of rushes, reeds and sedges - waterlogged soils posing problems of nutrient availability - the role of plants like Alder and Bog Myrtle in fixing atmospheric nitrogen - climax of terrestrial shrubs and trees as soil levels build up above the water table. <p>(Specific detail will depend on the</p>	<p>factors outlined in the previous column. This could be completed as a paired task with each partner working on one ecosystem and then sharing their findings.</p> <p>Group discussion about what students think are the characteristics of the climatic climax in the UK.</p> <p>Students could construct a small project on the temperate deciduous woodland biome as found in the British Isles. This should include:</p> <ul style="list-style-type: none"> - distribution within the British Isles - characteristics – climate, vegetation, structure (canopy layer, sub canopy layer, herb layer), succession stages, vegetation adaptations. <p>Students could be encouraged to be creative in the method used to present their findings. These could be traditional reports, revision sheets, mind maps, or electronic presentations to share on a VLE. (There are opportunities for students to work together, or independently.)</p>	<p>ideas</p> <p>Climatic climax in the British Isles climatic climax temperate woodland</p> <p>Deciduous forest</p> <p>RGS: 60 second guide to temperate deciduous forest</p> <p>Plagioclimax – heather moorland</p> <p>Video: 5 human impacts on the environment CrashCourse video impacts of human activity on succession</p> <p>Heather Moorland: A plagioclimax</p> <p>BBC: Moorland</p> <p>Vegetation succession - sand dunes and moorlands Education Scotland resources on Moorland</p>
--	--	---	--	---

		<p>chosen ecosystem.)</p> <p>Students will reinforce the concept of climatic climax, and be able to analyse and evaluate the temperate deciduous woodland biome, to include:</p> <ul style="list-style-type: none"> - distribution within the British Isles - characteristics – climate, vegetation, structure (canopy layer, sub canopy layer, herb layer), succession stages, vegetation adaptations. <p>(Specific detail will depend on the chosen supporting example.)</p> <p>Students will be able to evaluate the effects of human activity on succession – illustrated by one plagioclimax such as a heather moorland. Areas of study may include:</p> <ul style="list-style-type: none"> - the concept of plagioclimax - characteristics of heather moorland – including distribution, soils, fauna and flora <ul style="list-style-type: none"> • human impacts including arresting factors: harvesting, grazing, burning - secondary succession <p>(Specific detail will depend on the chosen ecosystem.)</p>	<p>Q&A/group discussion – in what ways do students think human activity affects succession? What is a plagioclimax?</p> <p>Students to work in pairs to produce a report/presentation/electronic resource to evaluate the impacts of human activity on succession in heather moorland. This should include material on:</p> <ul style="list-style-type: none"> - the concept of plagioclimax - characteristics of heather moorland – including distribution, soils, fauna and flora - human impacts including <ul style="list-style-type: none"> • arresting factors: harvesting, grazing, burning - secondary succession. <p>There is opportunity here to discuss or debate findings as a class.</p> <p>(Specific detail will depend on the chosen ecosystem.)</p> <p>Opportunity to use a range of practice exam questions to assess learning.</p>	
<p>Week 7-8</p> <p>Marine ecosystems</p> <ul style="list-style-type: none"> • The distribution and main characteristics of coral 	<p>Use of key subject-specific and technical terminology.</p> <p>Opportunities to</p>	<p>Students will be able to evaluate the distribution and main characteristics of coral reef ecosystems, including:</p>	<p>Q&A/group discussion to ascertain what students know about coral reef ecosystems.</p>	<p>Seaworld: Coral and coral reefs</p> <p>Coral reef facts - simple introduction to coral reefs</p> <p>Coral reef biome</p>

<p>reef ecosystems. Environmental conditions associated with reef development.</p> <ul style="list-style-type: none"> The following aspects should be examined with reference to a named, located coral reef: Factors in the health and survival of reefs: <ul style="list-style-type: none"> - natural: water temperature, acidity, salinity, algal blooms. - human activity and its impacts: major drainage basin schemes, onshore development, desalination, pollution, tourism, fishing. - future prospects for coral reefs. 	<p>develop skills such as drawing, labelling and annotating diagrams.</p> <p>Online research into marine ecosystems – coral reefs.</p> <p>Construct and a range of graphs and use statistical skills.</p> <p>Developing extended writing skills.</p> <p>Using atlas maps.</p> <p>Using weather maps.</p> <p>Producing annotated maps.</p> <p>Practising exam style questions. Including the use of peer assessment.</p> <p>Conducting independent and group research tasks.</p> <p>Making links within, across and beyond this area of the specification.</p> <p>Engage with remotely sensed satellite data.</p>	<ul style="list-style-type: none"> - deep-sea cold-water coral reefs - tropical coral reefs. <p>Students will be able to analyse the conditions associated with reef development.</p> <p>Students will be able to analyse and evaluate factors in the health and survival of a named located coral reef system, to include:</p> <ul style="list-style-type: none"> - natural: water temperature, acidity, salinity, algal blooms. - human activity and its impacts: major drainage basin schemes, onshore development, desalination, pollution, tourism, fishing. - future prospects for coral reefs. <p>(Specific detail will depend on the chosen supporting example.)</p>	<p>Students to produce an annotated map to illustrate the distribution of coral reef ecosystems.</p> <p>Research task for students to produce an assessment of the characteristics of coral reef systems and the conditions associated with their development.</p> <p>Opportunity for independent/paired or group research task. Students to be given clear instructions to conduct research into a named, located coral reef. This should cover the factors in the health and survival of reefs:</p> <ul style="list-style-type: none"> - natural: water temperature, acidity, salinity, algal blooms. - human activity and its impacts: Major drainage basin schemes, onshore development, desalination, pollution, tourism, fishing. - future prospects for coral reefs. <p>Students could be encouraged to be creative in the method used to present their findings. These could be traditional reports, revision sheets, mind maps, or electronic presentations to</p>	<p>How do coral reefs form? Video: What are corals?</p> <p>Resources for specific case studies will depend on those chosen by the individual student/centre.</p> <p>Factors in the health and survival of coral reefs: Coral reefs and environmental impacts WWF: Threats to coral reefs Coral bleaching - coral bleaching impacts. Human threats to coral reefs Coral reef stressors - tourism and recreational impacts. Factors that impact coral health - human activities that threaten coral reefs. Video: Human impacts on coral reefs - short summary video clip of some threats to coral reefs.</p> <p>Future prospects for coral reefs: Protecting coral reefs Climate change impacts on coral reefs BBC story: Will we ever lose all of our coral reefs - BBC article with some excellent images. Coral reefs: Ecosystems of environmental and human value Video: Ask not what coral reefs can do for you – Prof David Bellwood on issues facing coral reefs.</p>
---	--	---	--	---

			share on a VLE. Opportunity to use a range of practice exam questions to assess learning.	
<p>WEEK 9-10 Local ecosystems</p> <ul style="list-style-type: none"> The main characteristics of a distinctive local ecosystem (such as an area of heathland, managed parkland, pond, dune system). Ecological responses to the climate, soil and soil moisture budget – adaptations by flora and fauna. Local factors in ecological development and change (such as agriculture, urban change, the planned and unplanned introduction of new species). The impacts of change and measures to manage these impacts. Conservation strategies and their implementation in specific settings. 	<p>Use of key subject-specific and technical terminology.</p> <p>Opportunities to develop skills such as drawing, labelling and annotating diagrams.</p> <p>Online research into local ecosystems.</p> <p>Construct and a range of graphs and use statistical skills.</p> <p>Developing extended writing skills.</p> <p>Using atlas maps.</p> <p>Producing annotated maps.</p> <p>Practising exam style questions. Including the use of peer assessment.</p> <p>Conducting independent and group research tasks.</p> <p>Making links within, across and beyond this area of the</p>	<p>Students will be able to analyse and evaluate the main characteristics of a distinctive local ecosystem (such as an area of heathland, managed parkland, pond, dune system). This could involve the study of:</p> <ul style="list-style-type: none"> abiotic environmental factors and biotic communities key habitats its food chain and trophic levels succession in the chosen ecosystem. <p>Students should be able to assess the local factors in ecological development and change – this could relate to the chosen local ecosystem above – to include:</p> <ul style="list-style-type: none"> agriculture urban change the planned and unplanned introduction of new species. <p>Again this could relate to the chosen local ecosystem and students will be able to assess the impacts of change and measures to manage these impacts. Students will then be able to evaluate strategies that have been implemented in the chosen local ecosystem settings.</p> <p>(Specific detail will depend on the</p>	<p>Students could be given the opportunity to choose which distinctive local ecosystem to study or the whole group could study the same – one from an area of heathland, managed parkland, pond, dune system.</p> <p>Students to use a variety of recourses to research the chosen local ecosystem, to include:</p> <ul style="list-style-type: none"> distinctive characteristics (as listed in the previous column) Ecological responses to the climate, soil and soil moisture budget – adaptations by flora and fauna. <p>Opportunity to use a variety of practice exam questions to assess learning.</p> <p>Opportunity for a group research task to collaboratively produce a resource that explores local factors in ecological development and change to include:</p> <ul style="list-style-type: none"> agriculture urban change 	<p>Resources for specific case studies will depend on those chosen by the individual student/centre.</p> <p>Heathland: Lowland Grassland and Heathland link to at risk areas of heathland. Upland Heathland Threats to UK Lowland heathland habitats Ecology of Heathland British habitats - Lowland heathlands Heathland Biodiversity Heathland issues and what can be done Heathland conservation issues</p> <p>Managed parkland: Barnsley Biodiversity trust managed parkland around Barnsley Yorkshire. Woodland Trust - Wood, pasture and parkland Devon Biodiversity action plan Ecosystem services from managed landscapes Wildlife trust - wood-pasture and parkland - parkland conservation. Conservation Grazing conservation issues in Southeast England.</p> <p>Pond: Changing Hudson Project - Pond Ecosystem Freshwater ecosystems - ponds for permaculture</p>

	<p>specification.</p> <p>Engage with remotely sensed satellite data.</p>	<p>chosen supporting example.)</p>	<p>- the planned and unplanned introduction of new species.</p> <p>This also gives an opportunity for a group discussion or debate about issues raised above.</p> <p>Students should use the internet (or textbook) resources to research how impacts of change in a local scale ecosystem are being managed.</p> <p>This leads to an exploration of conservation strategies and their implementation in specific settings</p> <p>Opportunity to use a range of practice exam questions to assess learning.</p> <p>(This whole section could feed into the completion of coursework for the Non-examination assessment element of the specification).</p>	<p>TESSA - Observing local ecosystems Open University resources on studying pond ecosystems.</p> <p>Freshwater animal and plant adaptations</p> <p>EPCN - The pond manifesto – pond conservation issues.</p> <p>The Freshwater blog</p> <p>The Nature Conservancy - Why is our water in trouble? - freshwater conservation.</p> <p>Dune system:</p> <p>The Wildlife Trusts - Coastal sand dunes</p> <p>The Geography site - sand dunes</p> <p>The Macaulay Institute - Vegetation succession: sand dunes</p> <p>Dune plant adaptations lesson plan - simple lesson idea on vegetation characteristics.</p> <p>Word document - plant adaptations in sand dunes - FSC resources on dune adaptations.</p> <p>Scottish National Heritage - Dune grass planting - dune conservation issues.</p> <p>East Sussex County Council - Sand dune management plan - East Sussex Sand Dune Management Plan.</p> <p>United Nations Environment Programme - Dune and beach conservation and restoration - UNEP Dune and Beach conservation and restoration.</p>
<p>Week 11</p> <p>Case study 1</p> <p>Case study of a specified region experiencing ecological change to illustrate and analyse the</p>	<p>Collect, analyse and interpret a range of qualitative and quantitative data from a range of secondary sources.</p>	<p>Much of what is taught here will depend on the region chosen.</p> <p>Students should understand that specific regions are experiencing ecological change. Students should be able to identify, analyse and</p>	<p>Opportunity for group discussion to identify a specified region experiencing ecological change.</p> <p>Students should reflect on how they have completed</p>	<p>Resources for specific case studies will depend on those chosen by the individual student/centre.</p> <p>Some resources that relate to ecological change:</p> <p>Ecological impacts of climate change</p>

<p>nature of the change and the reasons for it, how the economic, social and political character of its community reflects its ecological setting and how the community is responding to change.</p>	<p>Report writing.</p>	<p>evaluate:</p> <ul style="list-style-type: none"> - the nature of the change - the reasons for the change. <p>Students will be able to assess how the economic, social and political character of the people living there reflect their ecological setting.</p> <p>Students will be able to evaluate how the population living there are responding to the ecological change.</p>	<p>previous geographical case studies, then be given clear instructions and guidance about creating a detailed case study of one specified region experiencing ecological change. That must focus on:</p> <ul style="list-style-type: none"> - the nature of the change and the reasons for it - how the economic, social and political character of its community reflects its ecological setting - how the community is responding to change. <p>Students could be encouraged to be creative in the method used to present their findings. But as a guide it should include the information listed in previous column. (There are opportunities for students to work together, or independently)</p> <p>(This could feed into the completion of coursework for the Non-examination assessment element of the specification).</p>	<p>Species conservation, rapid environmental change and ethological ethics Green facts - Ecosystem change Ecological succession - summary Global and regional ecology The regional impacts of climate change Biodiversity and climate change - a summary of impacts in the UK Biodiversity and climate change in the UK - DEFRA</p>
<p>Case study 2</p> <p>Case study of a specified ecosystem at a local scale to illustrate and analyse key</p>	<p>Collect, analyse and interpret a range of qualitative and</p>	<p>Much of what is taught here will depend on the local scale ecosystem chosen.</p>	<p>Opportunity to discuss the broad themes of this unit in respect to one local-scale ecosystem including:</p>	

<p>themes set out above, including the nature and properties of the ecosystem, human impact upon it and the challenges and opportunities presented in its sustainable development.</p>	<p>quantitative data from a range of secondary sources. Report writing.</p>	<p>Ensure students understand that if Case Study 1 related to a 'region' within a country then Case Study 2 must relate to a <i>smaller local</i> scale place – a named place/location.</p> <p>Students must be able to identify and analyse:</p> <ul style="list-style-type: none"> - the nature and properties of the ecosystem - the human impacts upon the ecosystem - the challenges and opportunities presented in its sustainable development. 	<ul style="list-style-type: none"> - nature and properties of the ecosystem - human impact upon it - the challenges and opportunities presented in its sustainable development. <p>Students should reflect on how they have completed previous geographical case studies, then be given clear instructions and guidance about creating a detailed case study of one specified local scale ecosystem. To include the themes listed above.</p> <p>Students could be encouraged to be creative in the method used to present their findings. But as a guide it should include the information listed in the previous column. (There are opportunities for students to work together, or independently)</p> <p>(This could feed into the completion of coursework for the Non-examination assessment element of the specification).</p>	
--	---	--	---	--

Quantitative and qualitative skills

Students must engage with a range of quantitative and relevant qualitative skills, within the theme Ecosystems under stress. Students must specifically understand simple mass balance, unit conversions and the analysis and presentation of field data.

Making connections

Students must consider connections between the subject matter studied and be able to apply their geographical knowledge and understanding in different contexts including within a unit, between units and to novel situations, ie geographical contexts beyond the specification.