Cranedale Centre

OCR A (2015) Biology at the Cranedale Centre

Syllabus Links and Topic Detail

Overview

The Cranedale Centre has had extraordinary success in delivering the new **OCR A biology** specification 2015. Our fieldwork topics are tailored to coach students through the much of the content of AS/A-level and A-Level **Topics 1, 4 & 6** (examined in Papers 1, 2 and 3).

The **Practical Acitivity Groups** are the key elements of our courses and we craft the fieldtrip around them to allow students to grow in confidence in the associated *Apparatus & Techniques*, *Practical* and *Mathematical Skills* and the opportunity to demonstrate progression in their practical competency.

Syllabus content is strong throughout the trip and students are encouraged to make notes and draw connections between different parts of the specification. We also seek to inspire students beyond the specification through our enthusiasm for the subject and the experiential nature of the fieldtrip. Outlined in this document is a list of our most popular activities that we offer, complete with the associated syllabus links.

A typical Biology fieldtrip to the Cranedale Centre

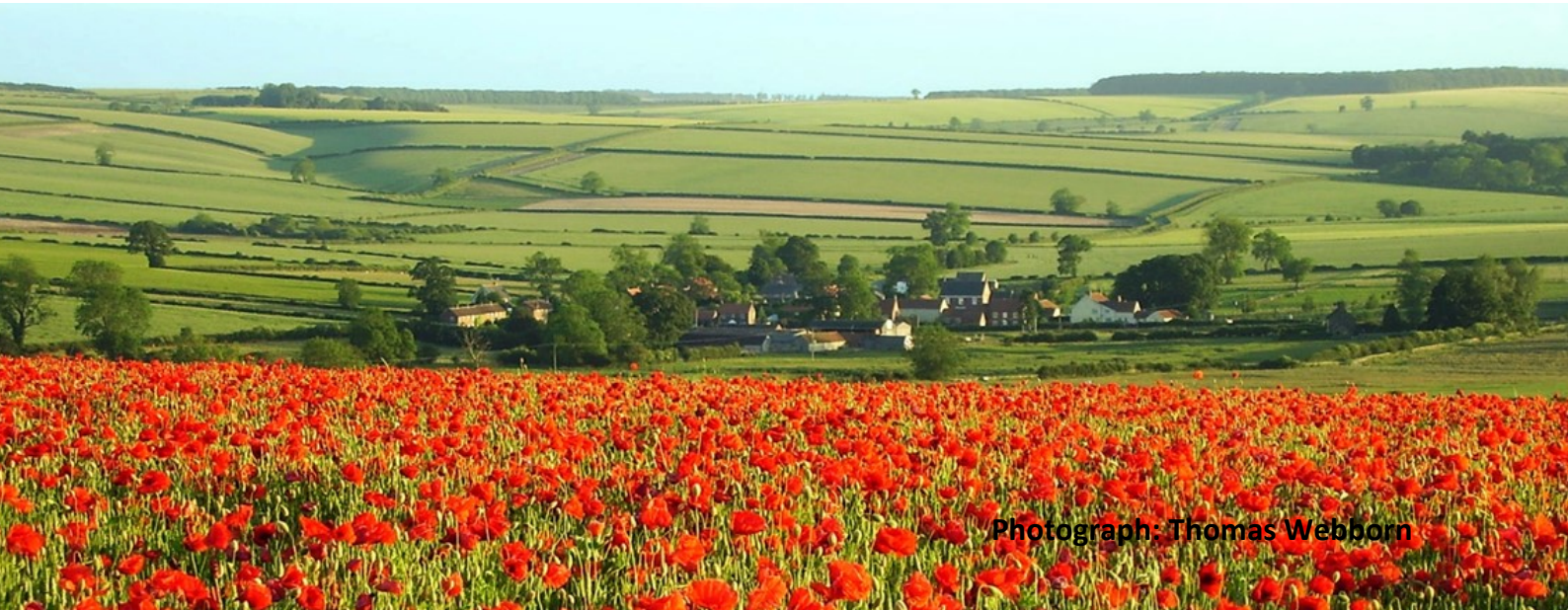
We always work closely with individual school teachers to tailor the content of the fieldtrip to their requirements. Outlined below is a fairly typical format for a biology fieldtrip.

Before the fieldtrip, we send out a student research worksheet that helps to inform the choices they make when planning and undertaking Practical Activity Group 3. This allows CPAC 5b to be achieved.

On the fieldwork days leading up to PAG3, we train students in a range of practical sampling skills, in addition to syllabus support. These may include choosing and justifying sampling techniques in fieldwork, assessing different measures of abundance and calculating uncertainties.

On the last evening, students work in groups to design a sampling strategy, choose the size and type of quadrat, the number of repeats and the statistical test (CPAC 2d).

On the final day, PAG3 is completed by students who have ample opportunity to demonstrate practical mastery of all CPAC elements, showing increasing independence and confidence. Our tutors continue to provide site and species information and guide groups with the use of instruments.



Practical Activity Group 3

We offer a range of titles, that include freshwater or rocky shore habitats (depending upon tides). Prior to the fieldtrip we can send out a student worksheet to help them to reference and research that will then inform the planning (CPAC 5b) of PAG3.

On the fieldwork days leading upto the PAG3, we train students in a range of practical sampling skills, in addition to syllabus support.

On the last evening, students work in groups to design a sampling strategy, choose the size and type of quadrat, the number of repeats and a statistical test (CPAC 2d). They also carry out a full risk assessment (CPAC 3a).

On the day of the PAG3, there is ample opportunity for students to demonstrate practical mastery of the CPAC elements and scientific skills as our tutors continue to provide site and species information and guide groups with the use of instruments. Statistical analysis is carried out using iPads in the field with each student group reporting their findings at the end, generating a holistic understanding of the biotic and abiotic interactions within the ecosystem.

AT Skills: **a** (use of appropriate apparatus), **b** (use of appropriate instrumentation to record qualitative measurements such as a colorimeter), **d** (use of light microscope at low power with a graticule), **e** (produce a scientific drawing from observation with annotations), **h** (safe and ethical use of organisms), **j** (safely use Instruments for dissection), **k** (use sampling techniques in fieldwork), **I** (use ICT software or data logger to collect and process data)

Mathematical Skills: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.9, 1.11, 2.1, 3.2

Syllabus Links referenced:

3.1.3 (e i) behavioural, physical and anatomical adaptations to the environment
4.2.1 (b) Sampling to measure biodiversity, importance of sampling, Practical Investigations collecting random and non-random samples in the field (opportunistic, stratified, systematic)
4.2.2. (a) Biological classification of species, the three Domains
4.2.2. (b) Binomial System
4.2.2 (g) Intraspecific and interspecific variation – standard deviation, Students T-test, Spearman's Rank Correlation Coefficient
4.2.2. (g) Adaptations of organisms to their environment
5.2.1 (g) Factors affecting Photosynthesis
6.3.1 (a) Biotic & abiotic factors, Ecosystems are dynamic and influenced by these
6.3.1 (e) Measuring the distribution and abundance of organisms
6.3.1 (e) The use of sampling and recording methods to determine the distribution of organisms in a variety of ecosystems
6.3.2 (b) Interspecific and intraspecific competition

Chromatography of Seaweeds (PAG6)

Students use thin-layer chromatography to investigate the photo-pigments of red, brown and green seaweeds. Their results are then used as evidence by the students to answer challenging questions about the relatedness of seaweeds to terrestrial plants and suggest possible patterns of seaweed distribution with relation to light availability at depth within the intertidal zone.

AT Skills referenced: **a** (use appropriate apparatus), **c** (use laboratory glassware), **g** (separate biological compounds using thin layer chromatography)

Mathematical Skills referenced: 0.3, 2.4

Syllabus Links Referenced:

5.2.1 Photosynthesis

(c) (i) the importance of photosynthetic pigments in photosynthesis

(ii) practical investigations using thin layer chromatography to separate photosynthetic pigments

5.2.1 (s) (i) the principles and uses of paper and thin layer chromatography to separate biological molecules/compounds; to include calculation of Rf values

(ii) Practical investigations to analyse biological solutions using

Microscopy of an Olive Mayfly Nymph (PAG1)

Using light microscopes at low power with graticules, students produce a scientific drawing to scale from observation of a live mayfly nymph and include annotations explaining its adaptations for gas exchange.

AT Skills referenced: **a** (use of appropriate apparatus), **d** (use of light microscope at low power with a graticule), **e** (produce a scientific drawing from observation with annotations) and **h** (safe and ethical use of organisms)

Mathematical Skills referenced: 1.8

Syllabus Links referenced:

3.1.1 (f) Mechanisms of ventilation and gas exchange in bony fish and insects

4.2.2 (g) Adaptations of organisms to their environment

Owl Pellet Dissection (PAG1 & PAG2)

Students safely use instruments to dissect an owl pellet and use a light microscope with graticule to produce a scientific drawing with scale bar and annotations. Students show competency in the safe use of mounted needles and points to mount specimens. Time permitting, students use the Chi2 test to compare Barn Owl diets between the Yorkshire Wolds and nearby Vale of Pickering.

AT Skills referenced: **a** (use of appropriate apparatus), **d** (use of light microscope at low power with a graticule), **e** (produce a scientific drawing from observation with annotations) and **j** (safely use Instruments for dissection)

Mathematical Skills referenced: 1.8, 1.9

Syllabus Links referenced:

4.2.1. (a) Biodiversity at different levels (Habitat, Species and Genetic) (f) Factors affecting Biodiversity

4.2.1. (h) In situ methods of maintaining biodiversity – wildlife reserves (e.g. Nature Reserves and SSSIs)

4.2.2 (g) Adaptations of organisms to their environment

6.3.1 (a) Biotic & abiotic factors, Ecosystems are dynamic and influenced by these

6.3.1 (e) Measuring the distribution and abundance of organisms 6.3.2. (c) Conservation and preservation

6.3.2 (a) Factors that determine the size of a population – significance of limiting factors determining the carrying capacity and impact on population size. Predator-prey relationships and Inter-specific/Intra-specific competition

Choice Chamber Experiment with Freshwater Shrimp —(PAG11)

Students will investigate the effect of an environmental variable such as light levels or substrate material on the movement of shrimp, Gammarus pulex, using a choice chamber. To conclude, students will process their data using an iPad and will be trained in the use of the Chi2 test.

AT Skills: **a** (use of appropriate apparatus), **b** (use of appropriate instrumentation to record qualitative measurements such as a colorimeter) **d** (use of light microscope at low power with a graticule), **e** (produce a scientific drawing from observation with annotations) **h** (safe and ethical use of organisms) and **j** (safely use Instruments for dissection) **k** (use sampling techniques in fieldwork), **l** (use ICT software or data logger to collect and process data)

Mathematical Skills referenced: MS 1.9

Syllabus Links referenced:

4.2.2 (g) the different types of adaptations of organisms to their environment

5.1.1 (d) the physiological and behavioural responses involved in temperature control in ectotherms and endotherms

Energetics & Farming

Agricultural Energetics

Students contrast the productivity of two agricultural-ecosystems in an effort to determine the sustainable future of farming in an increasingly crowded world. Students calculate net productivity of indoor commercial breed pigs and compare this to outdoor rare breed pigs. The farming practices that are designed to increase productivity (increasing efficiency of energy transfer and reducing respiratory losses) are quantified and calculated.

Trout Farm Energetics

Students visit a local fish farm to investigate the effect of aquaculture on the water quality of a freshwater ecosystem by measuring a range of abiotic variables upstream and downstream of the farm system. Variables include oxygen, turbidity, temperature, conductivity, nitrate, ammonium and phosphate. In addition students gain an understanding of the way farmers are manipulating the energy efficiency of Rainbow Trout, itself an ectotherm, and calculate the growth rate, productivity and daily respiratory losses of various species of farmed fish. The sustainability of aquaculture and farming techniques that reduce biodiversity are also discussed.

AT Skills referenced: **a** (use of appropriate apparatus), **b** (use of appropriate instrumentation to record qualitative measurements such as a colorimeter), **h** (safe and ethical use of organisms)

Mathematical Skills referenced: 0.1, 0.3, 0.4, 2.2, 2.3, 2.4, 3.1, 3.2, 3.5, 3.6,

Syllabus Links Referenced:

3.1.1 (f) Mechanisms of ventilation and gas exchange in bony fish and insects

4.1.1 (b) Means of transmission of animal and plant communicable pathogens

4.2.1 (f) How agriculture affects biodiversity

4.2.1 (f) Pedigree animals

4.2.1 (g) Ecological, Economic & aesthetic reasons for maintaining biodiversity and genetic resources

4.2.2 (g) Adaptations of organisms to their environment

5.2.2 (j) The difference in relative energy values of carbohydrates, lipids and proteins as respiratory substrates

6.1.2 (b) Genetic diagrams to show patterns of inheritance

6.3.1 (b) Measuring biomass transfer between trophic levels, efficiency of transfer, human manipulation of biomass transfer

6.1.2 (h) Principles of artificial selection and its uses

Syllabus Links & Topic Detail for OCR Biology 2015

Population Studies

Overnight Population Studies with Data Logger

Setting humane traps including Longworth and camera for mammals, light traps for moths and pitfall traps for invertebrates equips students with a wide range of experience using equipment and techniques to monitor species populations. Students are challenged to employ safe and ethical scientific practices when setting each trap and evaluate the limitations of each trapping method. In addition, students set-up a Data Logger to record the overnight humidity, air temperature, wind speed and direction and associate the success of the trap with conditions overnight.

AT Skills referenced: **a** (use of appropriate apparatus), **h** (safe and ethical use of organisms), and **I** (use ICT software and data logger to process data)

Mathematical Skills referenced: 1.2, 1.3

Syllabus Links referenced:

4.2.1 (b) Sampling to measure biodiversity, importance of sampling, Practical investigations collecting random and non-random samples in the field

4.2.1 (f) Factors affecting Biodiversity

6.3.1 (a) Biotic & abiotic factors

6.3.1 (e) Distribution and abundance of organisms

6.3.2 (b) Interspecific and intraspecific competition

4.2.1 (c) Species richness & evenness

4.2.2 (g) Adaptations of organisms to their environment

6.3.1 (c) Role of decomposers and microorganisms in recycling nitrogen 6.3.2 (c) Conservation and preservation

Bat Walk

Students are able to use specialist ICT equipment and software that collects and logs bats' ultrasonic calls. Using GPS to track the position of each bat sighting, calls are automatically interpreted and species identified whilst they explore different habitats and local roost sites.

AT Skills: **a** (use of appropriate apparatus), **h** (safe and ethical use of organisms) **I** (use ICT software or data logger to collect and process data)

Mathematical Skills referenced: 1.3

Syllabus Links referenced:

4.2.1 (b) Sampling to measure biodiversity, importance of sampling, Practical investigations collecting random and non-random samples in the field

4.2.1 (f) Factors affecting Biodiversity

6.3.1 (e) Distribution and abundance of organisms

6.3.2 (b) Interspecific and intraspecific competition

4.2.2 (g) Adaptations of organisms to their environment & 6.3.2 (c) Conservation and preservation

Cranedale Centre

Syllabus Links & Topic Detail for OCR Biology 2015

Population Studies

Mark, Release, Recapture & the Lincoln Index

Using 'snail-varnish', students are able to calculate the population size of a locally abundant motile species (the brown-lipped snail Cepaea nemoralis) using the mark-release-recapture method. Following the practical, students will better appreciate the assumptions of the technique and evaluate the results with reference to these.

AT Skills: a (use of appropriate apparatus), **h** (safe and ethical use of organisms), **k** (use sampling techniques in fieldwork)

Mathematical Skills referenced: 1.1, 1.5, 2.1, 2.2, 2.3

Syllabus Links referenced:

3.1.3 (e i) behavioural, physical and anatomical adaptations to the environment

4.2.1 (b) Sampling to measure biodiversity, importance of sampling, Practical investigations collecting random and non-random samples in the field (opportunistic, stratified, systematic)

4.2.2 (e) Theory of Evolution by natural selection

4.2.2. (g) Adaptations of organisms to their environment

6.3.1 (a) Biotic & abiotic factors, Ecosystems are dynamic and influenced by these

6.3.1 (e) Measuring the distribution and abundance of organisms

6.3.1 (e) The use of sampling and recording methods to determine the distribution of organisms in a variety of ecosystems

6.3.2 (a) Factors that determine the size of a population – significance of limiting factors determining the carrying capacity and impact on population size. Predator-prey relationships and Inter-specific/Intra-specific competition

Natural Selection in *Cepaea nemoralis*

Students explore the allele's effects on shell phenotype in this species which wears its genes on its banded back. The Hardy-Weinberg principle is used to calculate the frequency of alleles and genotypes. Woodland and grassland habitats are sampled to investigate whether selection is at work.

AT Skills: **a** (use of appropriate apparatus), **h** (safe and ethical use of organisms), **k** (use sampling techniques in fieldwork)

Mathematical Skills referenced: 1.1, 1.5, 2.1, 2.2, 2.3

Syllabus Links referenced:

4.2.1 (b) Sampling to measure biodiversity, importance of sampling, Practical investigations collecting random and non-random samples in the field (opportunistic, stratified, systematic)

4.2.2 (e) Theory of Evolution by natural selection (g) Adaptations of organisms to their environment

6.1.2 (a) the contribution of both environmental and genetic factors to phenotypic variation

6.1.2 (e) Factors affecting the evolution of a species (stabilising/directional selection, genetic drift, genetic bottleneck and founder effect 6.1.2 (f) Hardy-Weinberg principle – the equations will be provided

6.3.1 (a) Biotic & abiotic factors, Ecosystems are dynamic and influenced by these

6.3.1 (e) Measuring the distribution and abundance of organisms

6.3.1 (e) The use of sampling and recording methods to determine the distribution of organisms in a variety of ecosystems

6.3.2 (a) Factors that determine the size of a population – significance of limiting factors determining the carrying capacity and impact on population size. Predator-prey relationships and Inter-specific/Intra-specific competition

Succession Studies

Chalkland Succession (Summer)

Wharram Quarry (SSSI) is a rare and species rich ecosystem where succession is managed for conservation by the Yorkshire Wildlife Trust as a chalk grassland habitat. Students use point-frame quadrats, data-loggers, pooters and beating trays to investigate primary succession on a lithosere. Using their own primary data on the vegetation, microclimate, soil and invertebrates, students are challenged to solve the chronological sequence of succession.

Sand Dune Succession (All year)

Primary succession on a psammosere is investigated by students at Bridlington South Sands, a small sand dune ecosystem on the east coast. Students are able to observe adaptations of xerophytic plants and carry out the classic belt transect using quadrats and percentage cover to investigate the changes in vegetation in relation to edaphic factors.

Wetland Succession (Spring & Autumn)

Tophill Low (SSSI) is a managed nature reserve run by Yorkshire Water. Students are able to observe management of succession whilst gathering data from five distinct seral stages (both aquatic and terrestrial). Data-loggers and a range of abiotic instruments are used by the students to measure the soil, microclimate, flora and fauna. To conclude, students are challenged to piece together the sequence of succession of a hydrosere using their own primary data.

Moorland Succession (All year)

The North York Moors National Park is a heavily managed landscape, causing deep-running conflicts between conservationists and gamekeepers. Students sample an area of heather moorland owned and managed by the National Trust (Bridestones Moor, SSSI) using quadrats, data-loggers and abiotic equipment to investigate the changes associated with primary succession on a lithosere. Using their own primary data on the vegetation, microclimate, soil and invertebrates, students are then challenged to solve the chronological sequence of succession.

AT Skills: a (use of appropriate apparatus), **h** (safe and ethical use of organisms), **k** (use sampling techniques in fieldwork), **I** (use ICT software or data logger to collect and process data)

Mathematical Skills referenced: 0.3, 1.1, 1.2, 1.5, 1.6, 1.11, 2.1

Syllabus Links referenced:

4.2.1. (a) Biodiversity at different levels 4.2.1 (b) Sampling to measure biodiversity, importance of sampling, Practical investigations collecting random and non-random samples in the field

4.2.1 (f) Factors affecting Biodiversity

5.2.1 (g) Factors affecting Photosynthesis

6.3.1 (a) Biotic & abiotic factors (e) Distribution and abundance of organisms

6.3.2 (b) Interspecific and intraspecific competition

4.2.1 (b) Random sampling (h) In situ methods of maintaining biodiversity

6.3.1 (d) Primary succession from pioneer to climax, deflected succession

6.3.2. (c) Conservation and preservation

Cranedale Centre

Syllabus Links & Topic Detail for OCR Biology 2015

Biodiversity in Freshwater

Students design and carry out fieldwork to identify the impact of crayfish on the biodiversity of freshwater ecosystems. Students will kick sample two streams, one containing crayfish and identify all freshwater species using hand-lenses and dichotomous keys. Abiotic variables including dissolved oxygen concentration, nitrate and turbidity are measured and Simpson's Biodiversity estimates for each stream are then calculated. Students then utilise their own primary data to evaluate conflicting evidence regarding the future conservation of native crayfish species.

AT Skills: a (use of appropriate apparatus), **b** (use of appropriate instrumentation to record qualitative measurements such as a colorimeter) **h** (safe and ethical use of organisms), **k** (use sampling techniques in fieldwork)

Mathematical Skills referenced: 0.1, 1.1, 1.2, 1.4, 1.5, 1.6, 1.11, 2.1, 2.3

Syllabus Links referenced:

3.1.1 (f) Mechanisms of ventilation and gas exchange in bony fish and insects

4.2.1 (b) Stratified sampling

4.2.1 (c) Measurement of species richness & evenness

4.2.1 (d) Use and interpretation of Simpson's Index of diversity

4.2.1 (g) Ecological, Economic and Aesthetic reasons for maintaining biodiversity, Genetics, Landscapes, Keystone species

4.2.1 (g) Protecting keystone species

4.2.2 (g) Adaptations of organisms to their environment

5.2.1 (a) Interrelationship between photosynthesis & respiration

Classification & Taxonomy

Upon returning to the classroom after freshwater fieldwork investigations, students are challenged to classify the freshwater species they encountered and to construct a phylogenetic tree. The theory behind taxonomy – the classification of diversity is discussed alongside the fundamentals of the biological principles of speciation, natural selection and extinction.

AT Skills:

Mathematical Skills referenced:

Syllabus Links referenced:

4.2.2 (a) the biological classification of species

4.2.2 (b) the binomial system of naming species and the advantage of such a system

4.2.2 (c) (i) the features used to classify organisms into the five kingdoms: Prokaryotae, Protoctista, Fungi, Plantae, Animali

4.2.2 (ii) the evidence that has led to new classification systems, such as the three domains of life, which clarifies relationship

4.2.2 (d) the relationship between classification and phylogeny

4.2.2 (e) the evidence for the theory of evolution by natural selection

Freshwater Energetics

Students conduct kick samples from a freshwater stream to catch and identify all species using hand lenses and dichotomous keys. The biomass of all aquatic organisms is quantified and students use their own primary data to construct pyramids of biomass, energy and trophic efficiency.

AT Skills: a (use of appropriate apparatus), **b** (use of appropriate instrumentation to record qualitative measurements such as a colorimeter) **h** (safe and ethical use of organisms), **k** (use sampling techniques in fieldwork)

Mathematical Skills referenced: 0.1, 1.1, 1.2, 1.4, 1.5, 1.6, 1.11, 2.1, 2.3

Syllabus Links referenced:

6.3.1 a) ecosystems, which range in size, are dynamic and are influenced by both biotic and abiotic factor

6.3.1 (b) biomass transfers through ecosystems

6.3.1 (c) recycling within ecosystems

6.3.1 (e) (i) how the distribution and abundance of organisms in an ecosystem can be measure (ii) the use of sampling and recording methods to determine the distribution and abundance of organisms in a variety of ecosystems.

6.3.2 (b) interactions between population

Marine Energetics

Filey Brigg (SSSI) is a biologically rich rocky shore environment which provides a dramatic and engaging ecosystem for fieldwork. Students place random quadrats within the inter-tidal zone and quantify the biomass of all organisms found whilst also being able to observe both anatomical and behavioural adaptations. Students use their own primary data to construct pyramids of biomass, energy and trophic efficiency.

AT Skills: a (use of appropriate apparatus), **b** (use of appropriate instrumentation to record qualitative measurements such as a colorimeter) **h** (safe and ethical use of organisms), **k** (use sampling techniques in fieldwork)

Mathematical Skills referenced: 0.1, 1.1, 1.2, 1.4, 1.5, 1.6, 1.11, 2.1, 2.3

Syllabus Links referenced:

6.3.1 a) ecosystems, which range in size, are dynamic and are influenced by both biotic and abiotic factor

6.3.1 (b) biomass transfers through ecosystems

6.3.1 (c) recycling within ecosystems

6.3.1 (e) (i) how the distribution and abundance of organisms in an ecosystem can be measure (ii) the use of sampling and recording methods to determine the distribution and abundance of organisms in a variety of ecosystems.

6.3.2 (b) interactions between population

Rocky Shore Ecology

The peninsula of Filey Brigg (SSSI) has tremendous opportunities for students to sample two shores with contrasting wave powers. Students participate in classic fieldwork techniques (such as belt transects and random sampling with quadrats) to gather robust primary data for use in all three statistical tests required at A-level. Differences in the morphology and population of limpets and the effect of desiccation on seaweed are two of the most popular studies. Students use refractometers for seawater salinity, anemometers for wind speed and a site-specific wave height chart. Finally, students draw conclusions regarding the distribution of organisms on the rocky shore with relation to measured abiotic and biotic interactions (particularly inter/intra-specific competition).

AT Skills: a (use of appropriate apparatus), **h** (safe and ethical use of organisms), **k** (use sampling techniques in fieldwork)

Mathematical Skills referenced: 0.1, 0.3, 0.4, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.9, 1.11, 2.1, 3.1, 3.2

Syllabus Links referenced:

3.1.3 (e i) behavioural, physical and anatomical adaptations to the environment

4.2.1 (b) Sampling to measure biodiversity, importance of sampling, Practical Investigations collecting random and non-random samples in the field (opportunistic, stratified, systematic)

4.2.2. (a) Biological classification of species, the three Domains (b) Binomial System (g) Intraspecific and interspecific variation – standard deviation, Students T-test, Spearman's Rank Correlation Coefficient

4.2.2. (g) Adaptations of organisms to their environment

6.3.1 (a) Biotic & abiotic factors, Ecosystems are dynamic and influenced by these

6.3.1 (e) Measuring the distribution and abundance of organisms (e) The use of sampling and recording methods to determine the distribution of organisms in a variety of ecosystems

6.3.2 (b) Interspecific and intraspecific competition

Marine Conservation

The sustainability of North Sea fisheries yields is examined through visiting Bridlington Harbour and viewing the landing of shellfish. RSPB Bempton Cliffs (SSSI, SPA, SAC) provides opportunity for students to view spectacular seabird assemblages from 130m high chalk cliffs. As apex predators, seabirds indicate the health of an ecosystem and students are able to conduct an EIA, evaluate evidence and data concerning climate change and the conservation of iconic species such as the Gannet and Puffin.

AT Skills: **h** (safe and ethical use of organisms)

Mathematical Skills referenced: 3.1, 3.2

Syllabus Links referenced:

3.1.3 (e i) behavioural, physical and anatomical adaptations to the environment

4.2.1 (h) In situ conservation including Marine Conservation Zones, Wildlife Reserves, Local Nature Reserves 4.3.2 (b) The impact of the rise in human population on ecosystems and biodiversity and the use of resources in a sustainable way 4.3.2 (c) The ecological, economic and scientific importance of species biodiversity

6.3.2 (a) Factors that determine the size of a population – significance of limiting factors determining the carrying capacity and impact on population size. Predator-prey relationships and Inter-specific/Intra-specific competition (c) The reasons for the differences in conservation and preservation (d) Management of fishing to provide resources in a sustainable way

Syllabus Links & Topic Detail for OCR Biology 2015

Sustainable Woodland Ecosystems

The environmental and economic benefits of broadleaved and coniferous woodlands are quantified through fieldwork that includes random sampling and sweep netting for invertebrates. Using the circumference and height of each tree, students quantify mass of carbon within a coniferous plantation and the broadleaved Ellers Wood (SSSI, SAC) and draw links with climate change and the carbon cycle. Students then make informed conclusions relating to the sustainable management of woodlands, balancing the conflicts between human needs and conservation.

AT Skills: **a** (use of appropriate apparatus), **h** (safe and ethical use of organisms), **k** (use sampling techniques in fieldwork), **l** (use ICT software or data logger to collect and process data)

Mathematical Skills referenced: 0.3, 0.4, 1.1, 1.2, 1.6, 1.11, 2.1, 3.1, 4.1

Syllabus Links referenced:

4.2.1 (g) Ecological, Economic and Aesthetic reasons for maintaining biodiversity (visit to Forge Valley Woods National Nature Reserve or Ellers Wood Special Area of Conservation)

4.2.1 (f) How climate change affects biodiversity

6.3.1 (c) Carbon cycle – role of organisms (decomposition, respiration and photosynthesis) and physical and chemical effects in the cycling of carbon within ecosystems

6.3.1 (c) Role of decomposers and micro-organisms (Nitrosomonas, Nitrobacter, Azotobacter, Rhizobium)

6.3.2 (c) The reasons for the differences between conservation and preservation

6.3.2 (d) Management of an ecosystem providing sustainable resources – timber production

6.3.2 (e) Management of environmental resources and effects of human activities