AQA (2015) AS & A Level Biology
Cranedale Centre

HIGH QUALITY FLEXIBLE FIELDWORK AT THE CRANEDALE CENTRE

The Cranedale Centre has had extraordinary success in delivering the **AQA biology** specification 2015. Our fieldwork topics are always tailored to the needs of the visiting school and are designed to coach students through much of the content of AS-level **Topic 4** and A-Level **Topics 4, 5 & 7** (examined in Papers 1, 2 & 3).

The **Required Practicals** are the cornerstone of our courses and we craft the field-trip 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 making our A-level field courses a richly rewarding experience that none will forget!

For further information on courses and availability please visit www.cranedale.com

REQUIRED PRACTICAL 12

We offer a range of titles that include freshwater or rocky shore habitats (depending upon tides). Students work in groups and have ample opportunity to demonstrate practical mastery of the skills and competencies assessed at A-level. Students choose a sampling strategy and statistical test before carrying out their study and report their findings back to the class.

REQUIRED PRACTICAL 7

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 phylogeny of seaweeds and suggest possible patterns of seaweed distribution with relation to biotic interactions and light availability at depth within the intertidal zone.

Rocky shore studies at Filey Brigg SSSI

Sampling techniques in fieldwork, Yorkshire Wolds

CRANEDALE CENTRE

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TROUT FARM ENERGETICS

Students investigate the effect of aquaculture on stream water quality by measuring a range of abiotic variables (Oxygen, turbidity, temperature, conductivity, nitrate, ammonium and phosphate). The farming practices that are designed to increase productivity (increasing efficiency of energy transfer and reducing respiratory losses) are quantified and calculated. The sustainability of aquaculture and farming techniques that reduce biodiversity are also discussed.

Student kick sampling

MARINE ENERGETICS

Students place random quadrats within the inter-tidal zone at Filey Brigg SSSI 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.

SAMPLING IN FIELDWORK—TRAINING SKILLS

Over a full field trip, students participate in classic fieldwork techniques (such as belt transects and random sampling with quadrats) to gather robust primary data for in the field statistical analysis using iPads.

Students are trained in uncertainties, cumulative means, nesting quadrats, justifying sampling strategies and measures of abundance. Scale scientific drawings can also be made in the field using hand lenses and callipers. All these skills aid students' ability and confidence when planning their RP12 and can be done over a wide range of fieldwork days.

FRESHWATER BIODIVERSITY

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.

AGRICULTURAL ENERGETICS

Students quantify the productivity of two contrasting agricultural-ecosystems in an effort to determine the sustainable future of farming in an increasingly crowded world. Students calculate and contrast the net productivity of indoor commercial breed pigs and 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. Students also use observations of the characteristics of the pig herd to interpret and predict the results of a monohybrid cross.

Pedigree pigs at Lime Tree Cottage

MARINE CONSERVATION

The sustainability of North Sea fisheries yields is examined through visiting Bridlington Harbour and viewing the landing of shellfish. A visit to RSPB Bempton Cliffs (SSSI) to view the spectacular seabird assemblages from 130m high chalk cliffs also allows students to gain an appreciation of the conflicts between human needs and conservation, evaluating data concerning climate change and the conservation of iconic species such as the Puffin.

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CHALKLAND SUCCESSION

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 (summer only).

Bee Orchid (Ophrys apifera)

MOORLAND SUCCESSION

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 (suitable all year).

WETLAND SUCCESSION

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 (suitable all year).

OWL PELLET DISSECTION

After safely using instruments to dissect an owl pellet, students use microscopes at low power with graticules to make a scale scientific drawing of the pellet's contents. Students also show competency in the safe use of sharps including needles and pins to mount specimens.

POPULATION STUDIES

Students are challenged to make ethical considerations and set a range of humane traps for mammals, moths and invertebrates to monitor species populations. In addition, students set-up a Data Logger to record the overnight humidity, air temperature, wind speed and direction and associate the success of a moth trap with respect to the overnight conditions. Students finally evaluate the limitations of each trapping method.

SAND DUNE SUCCESSION

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 (suitable all year).

MARK RELEASE RECAPTURE

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.

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.

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