



A-LEVEL/IB ECOLOGY **AND CONSERVATION:**

Sample programme for 1-3 day course to meet Edexcel, SNAB, AQA, OCR and IB requirements

Wildwood can offer experience of **practical ecological sampling techniques:**

- in its different aged blocks of coppiced woodland to examine changing abiotic and biotic factors affecting the woodland communities
- and/or on a rocky shore with dunes for zonation/succession studies
- we can also offer a large variety of students' own investigations with supporting literature and expert help
- as well as opportunities for assessed practicals (e.g. OCR)

We are also a leading centre for the **conservation of endangered native species** and can offer a range of conservation-based topics, including:

- captive breeding and reintroduction (we breed 100-250 water voles – the UK's most catastrophically endangered mammal) for reintroduction each year as well as red squirrels for release to N Wales
- importance of studbooks and genetics (we hold the hazel dormouse studbook and are part of the European Endangered Species Programme for the European bison)
- inbreeding (bison) and hybridisation (Scottish wildcat)
- problems with reintroducing small carnivores (e.g. otters, pine martens)
- large carnivore reintroductions and controversy (wolves, lynx)
- reintroduction of keystone species as habitat managers/conservation grazing (wild horses, beavers, wild boar)
- impact of alien species on islands (grey/red squirrel; North American mink/water vole)

SCHOOL'S REQUIREMENTS

Schools usually choose Wildwood to give students practical experience of the following:

- Communities and ecosystems plus abiotic factors affecting these
- Food webs, chains and interactions (prey/predators; inter/intraspecific competition)
- Populations
- Biodiversity
- Statistics
- Mark-release-recapture (principles and controlled experiment)
- Evolution: natural selection of favourable characteristics
- Classification

- Human impact on ecosystems
- Woodland management, coppicing, succession and sustainable use of timber
- Practical conservation techniques, focusing on UK native endangered species, past and present

What we offer:

WOODLAND ECOLOGY

Practical work offered at Wildwood in different stages of coppiced sweet chestnut woodlands over 1-3 days (selected by school):

Day 1:

- Introduction to sampling small mammals through small mammal trapping plus explanation of fur-clipping mark-recapture technique (optional)
- Random sampling of plants on the woodland floor using quadrats and line/belt transects
- Impact of light and shade on plant distribution, diversity, leaf size, plant height etc
- Random sampling of leaf litter invertebrates

Plus, if wished:

- Lincoln Index mark-recapture study (invertebrates)
- Point quadrat demonstration
- Ecological statistics workshop (1hr)
- Introduction to coppicing, succession, sustainable use of timber and importance of coppice management to wildlife
- Captive breeding schemes and the role of zoos in conservation of endangered species (genetics, studbooks, hybridization etc)
- Prey-predator relationships
- Inter-specific/intra-specific competition
- Role of large herbivores in habitat management and rewilding programmes to reintroduce large carnivores (which can include a trip to a local nature reserve to see one of our herds of Konik horses)

Day 2/3:

- Students' own investigations using techniques taught on day 1.

WILDWOOD'S INTERPRETATION AND PLAN

Day 1:

Recap briefly

- What ecology is
- How we assess the richness of an ecosystem/habitat
- What we use to measure it – one key indicator species or several
- Importance of random sampling
- Importance of standardized methods

- Importance of standardized accurate data collection (designing data sheets)
- Collection of supporting environmental and ecological data
- Examples of methods used to sample species here and abroad and adapting sampling techniques to different species and habitats: e.g. orchids, reptiles, otters, water shrews, dormice, small mammals, great crested newts, elephants, primates, chameleons, macaws etc.
- Health and safety at Wildwood

Teach in detail as required

- Importance of randomness in sampling (using random numbers, numbered grid, spin the pencil techniques)
- Random sampling techniques:
 - Quadrats, line and belt transects (ground flora)
 - Carpet tiles (leaf litter invertebrates)
 - Wellfield small mammal traps (wood mice, field voles, common shrews)
- Lincoln Index experiment
- Prepare students to devise and plan own projects and advise on good locations
- Ecological statistics

Practicals

Quadrats:

- Compare distribution of one/two plant species (e.g. honeysuckle/bramble) in two different woodland habitats (e.g. pine and newly coppiced woodland), where light may be a significant factor
- Take random samples using 1m² quadrats (spin the pencil technique)
- Identify honeysuckle and bramble
- Count no. individual plants of each species per quadrat
- Assess % leaf cover per species per quadrat
- Estimate species dominance per quadrat (Domin scale)
- Draw diagram of species distribution per quadrat
- Data can produce plant diversity index/habitat/light if identifying other plants as well
- Assess appropriateness of random quadrats in different woodland habitats and discuss wider uses (e.g. *elephants and wildebeest in savannah/orchids on chalk grassland, etc.*).

Quadrats and Line/Belt Transects:

- Demonstrate line/belt transects using a 10m random transect, marked at 1m intervals.
- Lay 1m² quadrats either side of transect (10 samples)
- Identify honeysuckle and bramble
- Count individual plants of each species per quadrat

- Assess % leaf cover per species per quadrat
- Estimate species dominance per quadrat
- Draw diagram of species distribution per quadrat
- Can produce plant diversity index/habitat/light too if identifying all plants
- Assess appropriateness of using quadrats with transects to sample plants within different woodland habitats and describe their wider use (e.g. *chameleons and orangutans in rain forest*).

Lincoln Index:

- Mark, release recapture study based on leaf litter invertebrates (woodlice or centipedes), using sieves, trays and pooters (*use Wildwood's invert ID guides*)
- Sample pre-prepared randomly distributed carpet refugia on woodland floor within 100^{m2} area of pine floor, both shaking out carpets and sieving leaf litter underneath to soil level
- Mark all chosen species with nail varnish
- Leave to mix for one hour minimum
- Return and re-sample
- Calculate population based on formula:

$$\frac{n1 \times n2}{n3}$$

$$= \frac{(\text{sample 1} \times \text{sample 2})}{\text{no. marked individuals in 2}^{\text{nd}} \text{ sample}}$$
- Assess reliability of Lincoln Index technique (*particularly useful if this has already been tested in controlled conditions in school*). Data on previous Lincoln Index experiments at Wildwood available.

Small mammal trapping:

- Wellfield small mammal traps laid out on standardized grids and/or transects
- Discuss trap design
- Usefulness of trapping v risks
- Animal welfare issues (bedding, food, heat, cold and rain, cannibalism and predation)
- Trappers' responsibilities
- Licensing requirements and safety (shrews)
- Percentage of trap occupation
- Reliability of technique as one off experiment v regular trapping
- Seasonal effect (higher trap occupancy October-March, gender/season bias)

Day 2/3:

- Students working in pairs on their own projects, either under Wildwood or teacher supervision
- Examples of projects selected by previous students:

- leaf litter invertebrates within 1m radius of mature trees of similar trunk radius in two different habitats (Corsican pine in pine forest and English oak in broadleaved coppice) – *quadrats on compass points*
- centipedes in leaf litter in different woodland habitats (*sieves and trays*)
- invertebrates on bramble in different woodland habitats and light/shade factors – *beating and sweeping*
- bush crickets on sweet chestnut coppice (*beating tray*)
- plant diversity within different woodland habitats and light/shade factors – *quadrats and transects*.

BEACH ECOLOGY

Practical work offered at Botany Bay, Margate, over 1-3 days (selected by school):

Day 1:

- Introduction to zonation/succession studies
- Random sampling of seaweeds and rocky shore animals on chalk cut platforms and rock pools using quadrats and line/belt transects
- Random sampling of specialist dune plants and invertebrates using quadrats and line/belt transects
- Impact of tides on distribution and growth of rocky shore species
- Impact of sand, wind and tides on specialist dune species

Plus, if wished:

Day 2/3:

- Students' own investigations using techniques taught on day 1.

WILDWOOD'S INTERPRETATION AND PLAN

Day 1:

Recap briefly

- What ecology is
- How we assess the richness of an ecosystem/habitat
- What we use to measure it – one key indicator species or several
- Importance of random sampling
- Importance of standardized methods
- Importance of standardized accurate data collection (designing data sheets)
- Collection of supporting environmental and ecological data
- Examples of methods used to sample species here and abroad and adapting sampling techniques to different species and habitats: e.g. orchids, reptiles, otters, water shrews, dormice, small mammals, great crested newts, elephants, primates, chameleons, macaws etc.
- Health and safety at Wildwood and/or the beach

- Specialist knowledge and advice

Wildwood Equipment List

We can provide basic equipment for the teaching day and for students to use when carrying out their own investigations. We also have a limited number of light meters, humidity meters and temperature probes which students are welcome to borrow.

We can supply:

- 50 x 1m² open quadrats (better for the larger woodland plants than half-metre ones)
- 50 x large sieves
- 50 x large trays
- 50 trowels
- 15 x 10m tape measures
- 6 x 30m tape measures (beach)
- 50 x pooters
- 10 x light meters
- 10 x temperature probes
- 8 ranging poles
- 30 x calipers

Schools usually supply:

- Clipboards
- Pencils
- Notebooks/paper
- Equipment for the students' own individual investigations, e.g. data loggers, light/soil humidity meters, additional canes for transects and string, small quadrats, sweep nets, pH testing kits, additional tape measures, metre sticks, etc.

Dressing for Wildwood/beach

Wildwood is an ancient woodland site that has always been traditionally managed by coppicing. The animal collection is housed in natural woodland enclosures and the paths are lined by dead hedges, from the coppiced timber. Woodland ecology students work off the paths and will have to be prepared to scramble over logs, jump small dry ditches, brush past brambles and nettles and cope with rain, sunshine, wood ants and other creepy-crawlies. The paths may also be very muddy after rain.

The beach has no shelter and is totally exposed – students should see the weather forecast beforehand and come prepared for heat (sunblock, sun hat, sun glasses and sleeved T shirts) or cold, gales and rain (proper waterproofs including leggings, extra jumpers etc)

Please advise them to wear/bring:

- trainers or other sensible footwear
- long trousers (jeans are best)
- hats and sun cream if very sunny
- large bottle of drink if hot
- waterproofs/wellies in case of rain.

Student Investigations

We can supply a list on request of suggested ecological investigations to meet different exam board requirements for both woodland and beach investigations.

Further Information

Please contact education@wildwoodtrust.org to discuss your own requirements. Each school is different in what it would like us to deliver and we endeavour to meet all individual requirements, from a half-day walking workshop to cover different conservation initiatives to a full three-day ecology course!