



## FSC Outdoor Classroom for Scotland Advanced Higher Programmes

*Our standard courses are fixed length with clearly stated outcomes and links with SQA Arrangements.*

### Investigations in Environmental Biology

5 days

Please visit  
<http://www.field-studies-council.org/outdoorclassroom/scotland/advancedhigherbiology.aspx>  
for alternative Advanced Higher programmes

## OVERVIEW

This five day programme is designed to meet the needs of both the ‘*Environmental Biology*’ and ‘*Biology Investigation*’ units. Students can be exposed to a wide range of habitats, organisms and issues, before making final choices for their individual investigations.

Students will leave having planned and carried out the data collection stages of their individual investigation and may have looked at ways to analyse and present data. The formal write up of the investigation will be completed back at school.

Our tutors provide guidance for Outcome 1 and Outcome 2, and can also provide a session on statistical analysis if required.

## PROGRAMME LENGTH

5 Days (4 nights with 12 teaching sessions)

*Monday-Friday, Wednesday-Sunday*

Groups would normally arrive in time to be taught in the afternoon of the first day and would then be taught on that evening and for three full days subsequently. Groups depart immediately after the morning session on the day of departure.

Day 1	Day 2	Day 3	Day 4	Day 5
Arrive Afternoon & evening sessions	Morning, afternoon & evening sessions	Morning, afternoon & evening sessions	Morning, afternoon & evening sessions	Morning session Depart after Lunch

## PROGRAMME CONTENT

Sessions include:

- Introduction to biological sampling, fieldwork and statistical analysis techniques
- Introduction to project planning techniques
- Investigations into freshwater pollution and habitat succession - hydrosere
- Visiting an organic farming and conservation project – applied biology
- Small mammal, freshwater invertebrate, and plant identification
- Measuring abiotic and biotic factors
- Choice and completion of an individual project

**ARRANGEMENT LINKS:**

During this course students will cover the following aspects of the *Environmental Biology* Unit:

**Circulation in ecosystems:**

(2) Circulation of nutrients

- (i) 'Decomposition'
- (ii) 'Nutrient Cycling' including the nitrogen cycle and phosphorous cycle

**Interactions in ecosystems**

(1) Biotic Interactions

- (iii) Competition – exploitation competition and interference competition.

(3) The costs, benefits and consequences of interactions

- (i) Interaction between species – positive, negative and neutral interspecific interactions
- (ii) Interactions with the environment- responses to variants in environmental conditions

**Human impact on the environment**

Changes to ecosystems

- (i) Changes in complexity- autogenic succession and effecting external factors
- (ii) Effects of intensive food production-impacts on species diversity
- (iv) Pollution- biodegradable and toxic pollutants and the use of indicators in pollution monitoring

**TIMETABLE**

DAY	MORNING	AFTERNOON	EVENING
1	<p><b>Arrival</b> (approx. 12 - 1pm)</p> <p><b>Welcome and outline of the challenges ahead</b></p> <p>Tour of centre Settle into rooms Allocate kit (i.e. waterproofs)</p> <p><b>Introduction to Fieldwork</b> Introductory discussion to explore:</p> <ul style="list-style-type: none"> <li>• The importance of fieldwork</li> <li>• Biological sampling methods and techniques- including random, systematic and stratified sampling</li> <li>• Aims of the five day course</li> </ul>	<p><b>Freshwater Pollution Study</b> Students will undertake a freshwater investigation to:</p> <ul style="list-style-type: none"> <li>• Discuss the factors contributing to freshwater pollution</li> <li>• Collect biotic data – identify and collect biological indicator species above and below a pollution source</li> <li>• Collect abiotic data – measure nitrate, conductivity, pH and dissolved oxygen levels at and below a point pollution source</li> </ul>	<p><b>Follow up session</b> Students will use data collected in the previous session to:</p> <ul style="list-style-type: none"> <li>• Collate group data</li> <li>• Calculate Trent Biotic Index</li> <li>• Use Simpson’s Diversity Index and Jacards Similarity Index</li> <li>• Present findings in graphs, mirror bar-graphs and tables</li> <li>• Discuss the limitations</li> </ul>
2	<p><b>Succession of a Hydrosere</b> Students will undertake a fieldwork study to:</p> <ul style="list-style-type: none"> <li>• Introduce the concept of primary and secondary succession</li> <li>• Identify biotic and abiotic factors and how these change from water to dry land</li> <li>• Collect data along a line transect using systematic, interrupted sampling</li> <li>• Measure abiotic factors- take soil samples to analyse moisture content and measure gradient.</li> </ul>	<p><b>Follow up session</b> Students will use data collected in the previous session to:</p> <ul style="list-style-type: none"> <li>• Calculate the moisture percentage in the soil samples taken</li> <li>• Produce kit diagrams showing the abundance of species and associated abiotic data</li> <li>• Calculate species diversity</li> </ul>	<p><b>Small mammal identification</b> Students will set Longworth humane traps in grazed and fallow grassland to:</p> <ul style="list-style-type: none"> <li>• Catch and identify nocturnal mammals</li> <li>• Consider what habitats local small mammals prefer</li> </ul>
3	<p><b>Organic Farming and Conservation</b> Students will undertake a fieldwork visit to the SEER centre organic farm to:</p> <ul style="list-style-type: none"> <li>• Discuss conservation, agriculture and associated conflicts</li> <li>• Explore issues related to intensive farming and managing the environment</li> </ul>	<p><b>Introduction to Project Planning</b> Introductory discussion to explore:</p> <ul style="list-style-type: none"> <li>• Recap key ecological terms and definitions</li> <li>• Discuss the reasons for individual investigations and key skills required</li> <li>• Look at simple differences and correlation tests available</li> <li>• Identify/locate field sites</li> </ul>	<p><b>Project Planning</b> Students will plan their personal fieldwork project by:</p> <ul style="list-style-type: none"> <li>• Formulating hypotheses and research questions</li> <li>• Producing field data collection sheets</li> <li>• Identifying methodologies and completing equipment requests</li> </ul> <p>Identify what data they will collect and how they will process it</p>
4	<p><b>Project Fieldwork</b> Collection of fieldwork project data</p>		<p><b>Follow up session</b> Students will use the data collected in the previous session to start project problem solving and identify any further research required</p>
5	<p><b>Fieldwork completion and Statistics workshop</b> Students will carry out any further data collection required and a statistical workshop will be offered for those who wish to complete statistical analysis of their data</p>	<p><b>Lunch and depart</b></p>	

**Please note:** to ensure safe and quality learning experiences for students the timetable may alter depending on weather conditions and local factors at centres.

### **FSC KINDROGAN**

Located in rural Perthshire, at the edge of the Cairngorms National Park FSC Kindrogan is 11 miles from Pitlochry's mainline train station and close to the A9. The Centre itself is set in wooded grounds on the banks of the River Ardle and lies within easy reach of some of the most inspiring landforms in the Scottish Highlands and a rich range of wildlife habitats.



**KD**

Kindrogan

Tel: 01250 870150

### **TO BOOK THIS PROGRAMME, SIMPLY:**

1. Choose the time of the year you would like to attend
2. Check availability online or contact FSC Kindrogan

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**The FSC prides itself on being flexible. If you can't find a programme to meet your exact requirements a course specifically tailored to meet your needs can be developed. To discuss this, contact the centre of your choice. Fees will depend on what time of year you would like to visit and your length of stay but will be more expensive than FSC programmes at peak periods.**