

Suggested activities

KS4 Science, Geography

reach

There are many opportunities for learning in outdoor spaces within the different GCSE and BTEC science and geography specifications. Some of which are detailed below, with possible links to developing literacy and numeracy skills, as demonstrated in the LNF.

Activity	Resources	Links to literacy and numeracy
<p>Distribution of seaweed on the shore - Science</p> <p>Learners draw a transect from the tide lines and using quadrats record the area of each species found at intervals (using keys) – then convert their data to a kite diagram and explain why they think each species of seaweed was found in a particular position in the intertidal zone.</p>	<p>Tape measures, quadrats, keys, graph paper</p>	<p>Literacy Oracy across the curriculum: Developing and presenting information and ideas.</p> <p>Numeracy Developing numerical reasoning: Identify processes and connections, Represent and communicate, Review. Using number skills: Use number facts and relationships, Fractions, decimals, percentages and ratio, Calculate using mental and written methods, Estimate and check. Using data skills: Collect and record data, Present and analyse data, Interpret results.</p>
<p>Lichen survey – as pollutant indicators – Science, Geography</p> <p>Learners use keys to identify lichens in the outdoor space – and draw their position on their own map of the outdoor space. They also record the area covered by each lichen where feasible. They research the possible air pollutants from local and downwind industries. They then explain their findings in terms of possible air pollution in the outdoor space.</p>	<p>Keys, tape measures, internet access.</p>	<p>Literacy Oracy across the curriculum: Developing and presenting information and ideas. Reading across the curriculum: Locating, selecting and using information, Responding to what has been read. Writing across the curriculum: Organising ideas and information, Writing accurately.</p> <p>Numeracy Developing numerical reasoning: Identify processes and connections, Represent and communicate, Review. Using number skills: Fractions, decimals, percentages and ratio, Calculate using mental and written methods, Estimate and check. Using data skills: Collect and record data, Present and analyse data, Interpret results.</p>

<p>How does trampling affect grass growth? – Science</p> <p>This activity is best carried out in one of two areas; a sports' field or a well-used local field on a farm. Obviously grass is important in both these places. In a sports' field, the ball travels more uniformly on a good grass surface. Within a farm, grass is essential for grazing animals and therefore trampling destroys animals' food.</p> <p>Initially, learners can think about how trampling might affect grass growth. Then they can draw a scale diagram of the field. Using placed quadrats learners can estimate the percentage coverage of grass. They can then go on to explain how this could be rectified.</p>	<p>Tape measures, quadrats.</p>	<p>Literacy Oracy across the curriculum: Developing and presenting information and ideas. Writing across the curriculum: Organising ideas and information, Writing accurately.</p> <p>Numeracy Developing numerical reasoning: Identify processes and connections, Represent and communicate, Review. Using number skills: Fractions, decimals, percentages and ratio, Calculate using mental and written methods, Estimate and check. Using data skills: Collect and record data, Present and analyse data, Interpret results.</p>
<p>How does a pond sustain life? - Science</p> <p>Learners investigate a local pond using keys and sampling techniques to discover what lives in the pond and how these organisms are adapted to live in this habitat. They go on to explain how these organisms are related by food chains and develop a class food web for the pond. Using sampling techniques, they develop pyramids of numbers, biomass and energy in order to review energy efficiency in the food web.</p>	<p>Keys, nets etc.</p>	<p>Literacy Oracy across the curriculum: Developing and presenting information and ideas. Reading across the curriculum: Locating, selecting and using information, Responding to what has been read. Writing across the curriculum: Organising ideas and information, Writing accurately.</p> <p>Numeracy Developing numerical reasoning: Identify processes and connections, Represent and communicate, Review. Using number skills: Fractions, decimals, percentages and ratio, Calculate using mental and written methods, Estimate and check. Using data skills: Collect and record data, Present and analyse data, Interpret results.</p>

Investigating pollution of a river – Science, Geography

Learners study a local stream/river in order to find out what organisms live there and the abiotic factors that support life. They review oxygen concentration, rate of flow, pH etc. Looking at possible pollution, they review water quality indicator species such as:

Clean water – stonefly nymph, mayfly nymph

Some pollution – freshwater shrimp, caddis fly larva

Moderate pollution – blood worm, water louse

High pollution – rat-tailed maggot, sludgeworm

The webpages at: <http://www.nuffieldfoundation.org/practical-biology/monitoring-water-pollution-invertebrate-indicator-species> give further details of using such organisms as indicators of pollution.

Learners can go onto review possible local polluting industries/farming practices and suggest each one's effect on these species.

Nets, specimen bottles etc., keys, flow meters, digital monitors for oxygen, pH.

Literacy

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Numeracy

Developing numerical reasoning: Identify processes and connections, Represent and communicate, Review.

Using number skills: Calculate using mental and written methods, Estimate and check.

Using data skills: Collect and record data, Present and analyse data, Interpret results.