# Human influences

## These activities are intended to make children think about how humans impact on the wildlife around them

**Air Pollution**
Lichens are very sensitive to air pollution, particularly by sulphur dioxide. Their distribution gives some idea of how clean the air is: "crusty" lichens will tolerate some pollution, "leafy" lichens are less tolerant and "shrubby" ones will only survive in clean air. Map your school grounds to see where the cleanest and most polluted areas are.

**Alien Invaders**
Our native plants suffer extreme competition from many exotic species which have been introduced by gardeners but which have proved to be surprisingly invasive. These plants reduce biodiversity by pushing out native plants and by failing to support the communities associated with the species they displace. Examples include Japanese knotweed (particularly on river and stream banks) and rhododendrons (woodlands). Pest plants in ponds include Canadian pondweed and floating fern (Azolla). Survey surrounding areas for alien plants and note how little animal life they appear to support compared with neighbouring species. Measure their rates of spread. Record how quickly they recover from attempts at control; perhaps compare with a small area of native vegetation treated in the same way.

**Earthworm Populations**
Some earthworm species can be brought to the soil surface by soaking the soil with dilute formalin (50ml of 40% formalin added to 10 litres of water, applied to 1m² of ground). Rinse the earthworms in water as soon as they emerge and return them to soil elsewhere. In this way, the worm populations of land managed in different ways (different mowing regimes, different chemical and organic treatments etc.) can be compared. NB This can be destructive, so use this experiment in moderation. A more environmentally friendly, although not quite so effective, method is simply to saturate the ground with water.

**Effects of Management on Grasslands**
Using quadrats to sample, compare the vegetation and, if possible, the insect and invertebrate life between grassed areas which are managed in different ways. Variable factors might include: frequency of mowing; height of mowing; use or otherwise of fertilisers, herbicides or pesticides; grazing; trampling.

**Effects of Trampling on Grasslands**
Compare two sites which are managed in the same way but which are subject to different levels of trampling, using quadrats to sample. As well as observing differences in plant species composition, you may find that plants of the same species differ in their growth habits between the two sites. For example, daisies and plantains adopt a flattened rosette structure in trampled areas, while some grasses form tillers - outgrowths of the parent plant, each with its own leaves, stems and shoots.

**Freshwater Pollution**
The range of invertebrates caught in a pond, river or stream gives a useful indication of the occurrence or otherwise of eutrophication (overfeeding of the water with nutrients). Bloodworms (Chironomid larvae), sludge worms (Tubifex) and rat-tailed maggots (drone-fly larvae) have adaptations which allow them to breathe under the deoxygenated conditions caused by such pollution. If there are few species other than these, the water is likely to be polluted in this way. If very heavily polluted, there will of course be no life at all. Water lice, leeches, flatworms and pond snails may be found in addition if the pond is only moderately polluted. Freshwater shrimps are among the indicators of clean water, which will also contain a good range of other species including dragonfly, damselfly and mayfly larvae and freshwater limpets.

**Friends and Foes**
Study pest species and the creatures which - so long as they are not poisoned or deprived of their habitats - prey on them. Assign species recorded in surveys to friend, foe or neutral status according to accounts in books of their lifestyles.

**Global Issues**
Encourage pupils not to see their environment in isolation from the rest of the planet: each of us makes a local contribution to intensifying or alleviating global environmental problems. For example, is the management of the school grounds enhancing or diminishing biodiversity? Ask pupils to examine and evaluate the school's Green Charter. This will include consideration of the school's policy on emissions (relate to acid rain, global warming and ozone layer depletion), energy conservation and recycling.

**Grass Relatives**
Compare the structures of wild grasses with their artificially selected relatives the cereals. Grow cereals in a study plot and see how they compare with surrounding natural grasses with respect to growth rate, hardiness, susceptibility to diseases, resistance to being eaten (by insects and other animals) etc.

**Habitat Improvement**
Human design and management influences the usefulness of habitats to nature. Bearing in mind nature's needs and the restrictions imposed by necessary uses,

costs and other practicalities, ask your pupils to suggest a better plan for the school grounds.

**Land Use History**
Trace changes in land use, by comparing maps of different ages with the features seen today. Not all habitats are specified on maps, but they do certainly show some features - such as field boundaries, woodlands, rough areas, wet areas and built areas - which help in determining how land use has changed. Gather other evidence of land use changes, e.g. museum records and personal accounts of long term residents. Consider the effects (positive and negative) of these land use changes on nature and whether the human benefits (if any) have outweighed nature's losses. Retrospective debates on historical developments (see Plans for Development) would be interesting.

**Plans for Development**
A real or hypothetical proposed development which would affect a particular habitat is debated. This could range from the building of a road or supermarket to the felling of a single tree. Different pupils represent the interests of the various parties concerned, including businesses, local and national government, other politicians, the potential beneficiaries and those who might suffer the public in general and nature conservationists. With younger children, and any group with sufficient imagination, pupils can also play the roles of, and argue the cases for, specific animals which might be affected. The debate is followed by an open forum, in which the class discusses the issues and (if appropriate) constructs a compromise solution.

**Polluting the Soil**
Rates of Decomposition. The experiments described in the **Decay** section can be extended to compare rates of decomposition between plots which have been treated with artificial fertilisers, herbicides, pesticides etc.

**Seed Banks**
Take a sample of soil from a habitat and allow the seed in it to germinate and grow. Identify the species produced. Although some of the seeds will have been dispersed from nearby habitats, some of the species may be indicative of the existence of a different habitat on the site in previous times. See if you can make any deductions on this.

**Space for Wildlife**
Mark out a small square on the ground to represent a habitat under threat. Allocate cards to some of the children, each naming a factor which competes with wildlife for use of the habitat - e.g. farming, development, recreation, mineral extraction. There may be several types of each of these to consider which can have separate cards. Position those with these "threat" cards within the habitat, leaving no space for wildlife. Allocate plant and animal species cards to other children. Each species must argue a case for being allowed space in the habitat.

Each "threat" must suggest a compromise solution which would allow space for wildlife, and must then give up his or her space to a species.