



Today you are an ecologist. You have been asked to produce an information leaflet about things we could do to:

- reduce our impact on plants and animals in Britain
- help to combat climate change

Teacher information

Gallery visited	 Ecology
Suitable for	 Key Stage 3 (ages 11 to 14)
Curriculum links	Communication, organisms, behaviour and health, The environment, Earth and universe.
Example page	www.nhm.ac.uk/the-web-of-life-ks3
Pre-visit preparation	<p>Vocabulary: ecologist, energy, nuclear reactor, herbivore, carnivore, phytoplankton, excrete.</p> <p>Concepts: greenhouse effect, greenhouse gases, food chain, producer, raw materials, food web, nutrient recycling, competition for resources.</p>
Post-visit work	Pupils can combine information from the gallery with their own research work to complete the Final report task at the end of this guide.

1 Energy for life

The sun is the primary source of energy for life on Earth.

Notes on the sun should include some of the following ideas: the sun is a massive nuclear reactor, it is our powerhouse, it produces light, heat and other rays, some of which can be harmful.

Notes on the atmosphere should include some of the following ideas: it is a moving skin of gases, which is not uniform, (the atmosphere is not the same all the way up) and contains some protective layers.

The greenhouse effect

The sun's rays warm the Earth but much of this energy is radiated back out to space. Greenhouse gases absorb some of the heat that would be lost, so the atmosphere stays warm enough for life to flourish.

Humans are affecting it by activities that increase greenhouse gases, such as burning forests, using cars and other petrol-driven machinery, increasing cattle populations (methane producers) and using coal-fired power stations.

2 Food chains

Plants get energy from the sun.

Animals get energy from eating plants or other animals.

A food chain is a way of representing the feeding relationships between different organisms within an ecosystem. It shows the transfer of energy (and raw materials) from green plants to herbivores and then to carnivores.

While giving an example of a food chain, pupils do not have to copy the one on display but can detail any suitable organisms.

When completing a food chain from information in the food web display, there are many possibilities but they should all start with either seaweeds, phytoplankton or plant and animal remains.

3 Food webs

Number of connections in	Organism	Number of connections out
3	Edible crab	5
1	Common prawn	5
5	Common seal	0
4	Oystercatcher	0
2	Common dog whelk	2
1	Zooplankton	2

The top carnivores only have connections in, they have no connections out.

Discussion on animals that will be affected if the phytoplankton disappears

Possible answers include: common mussel, zooplankton, common prawn, oystercatcher, herring gull, common lobster, common dog whelk, humans, edible crab, common starfish, shanny, common seal. The pollock may also be included.

4 Nutrient recycling

grass

Some pupils may also tick the dung box if they remember (from their own general knowledge) that rabbits re-ingest their own soft pellets to digest them fully.
The rabbit gets its raw materials from its food.

urine

faeces

carbon dioxide

Scavengers (bacteria and fungi) break down the rabbit's body after it dies.

The complex chemicals turn into leaves and stems.

Student answers about what has happened to the minerals should describe how they are recycled. They start in grass, are eaten by the rabbit, become part of the rabbit, return to the soil when the rabbit excretes them and after the rabbit dies are turned into grass (or leaves and stems) again.

5 Population control

When there are plenty of resources and not many predators, the number of hares increases. This is because there is less competition and so it is not only the strongest who survive, others can reproduce, too.

The number of predators might also increase. Populations increase when there are enough resources to go around, and hares are resources for their predators.

If there are too many hares and not enough resources, the number of hares will decrease. Student explanations should refer to a lack of resources causing fewer hares to survive.

Benefit the hare population	Have a negative effect on the hare population
Food	Predators
Water	Competitors
Space, shelter	Parasites, disease

6 Competition in an ecosystem

<p>Food supply When there is plenty, the population will surge. When it runs out, individuals starve and their numbers start to fall.</p>	<p>Predators and prey The number of predators is determined by their food supply (available prey).</p>
<p>Avoiding competition Both swallows and bats feed on flying insects. They avoid competition by feeding in shifts (day and night).</p>	<p>Self control Many animals have built-in survival mechanisms. Female rats have fewer offspring in overcrowded conditions, when they are more vulnerable to disease and starvation.</p>

