



Explore the world of bat conservation through the national curriculum

Teachers' notes

7. PEOPLE NEED BATS

Bats as controllers of insects

Relevant areas of learning and experience:

Science and Technology Language, Literacy and Communication, Humanities – Geography, Health and Wellbeing

Insects are a hugely important part of life on earth. Estimates suggest that there are between two and 30 million different species; most authorities agree that there are more insect species that have not been described (named by science) than have been previously named.

All species are important. An ecosystem is balanced when the natural animals and plants and non-living components are in harmony- i.e. there is nothing to disturb the balance. Although many insects are beneficial to people, some are major agricultural pests. A disturbance is any change that causes a disruption in the balance of an ecosystem.

Make a list of ways in which insects are beneficial to people. Consider food, clothes, medicine, agriculture, soil improvement – what else?

What is a pest? Make a list of pests of crops, livestock and forestry. The term is also used for organisms that cause a nuisance, such as in the home.

The majority of bats eat insects, including many agricultural pests. As the primary predators of night-flying insects bats play a significant role in controlling insect populations. Attracting bats to farms can make a significant difference to farmers who want to avoid the use of pesticides. Bats are among the best friends to organic farmers. Some examples are described on the Fact Sheet *People need bats – insect control*.

- Investigate these in more detail, and find other ways in which farmers are already encouraging bats as natural pest controllers.

Chemical pesticides, still widely sold and used to control diseases, pests or weeds, are based on substances that are toxic (poisonous) to the pests involved.

- What are their drawbacks both to people and the natural world? How can they upset the balance of an ecosystem?
- Word clues for you to follow up and explain: Non-selective, resistance, accumulation, residual effect.
- What is a secondary pest?
- Why is it necessary to maintain an ecological balance? Find examples of instances where bats have been destroyed and insect pests have multiplied unchecked as a result.

Discussion:

- What would be the effects on the human population if bats became extinct?

Bats as inspiration for high-tech innovation

Search the web for more details of the research mentioned on the Fact Sheet and its benefits to people:

Studies of anticlotting chemicals in vampire saliva.

Development of sonar

Mechanics of bat flight

Longevity in bats

Other research includes navigational aids for the visually impaired.

Can you discover further research on bats and its benefit to people?

Pollination and seed dispersal

In the tropics many flowers are pollinated by bats. Use key words to search the web and build a list of these. Choose three (other than those mentioned on the fact sheet) and study in detail the ways in which the plants and the bats help each other.

Bat flowers. What special features do these 'bat flowers' have in order to attract the bats?

Collect or copy pictures of flowers visited by bats.

- How are the bats and flowers helping each other?

Bananas. Bats pollinate and disperse the seeds of wild bananas, but the commercial bananas we eat are grown only from suckers and have been seedless and without the need of pollination for thousands of years. Investigate the importance of bananas as a cash crop world-wide, and why there is concern at the threats to bananas by a number of diseases.

- Why are the fruit bats that pollinate the wild bananas so important?

Bats play a fundamental role in seed dispersal due to their exceptional species diversity, abundance, and a variety of canopy and understory feeding habits.

Iroko

Find out about the huge migration of the straw-colored fruit bats *Eidolon helvum* in West Africa. Explore the relationship between of the bats and the Iroko tree.

- How does the Iroko timber trade depend on the conservation of the bats?

Keystone species

- What is the purpose of the keystone in a building?
- Explain why bats are sometimes referred to as keystone species? Enlarge on this using the great baobab tree of the East African savannah *Adansonia* or the Kapok tree *Ceiba pentandra* as examples.

Commercial crops

Many cultivated crop species rely in the wild on bats. Find out about other economically important plants that rely on bats – papaya, almond, avocado, banana, guava, cashew, sisal, Saguaro cactus, durian, allspice, carob.

- What else? Visit www.batplants.co.uk

Pioneer plants

Where forest has been cleared or land disturbed, the first plants to grow are known as pioneer plants and are vitally important for forest regeneration. Researchers have found that in the tropics the seeds of over 90% of these pioneer trees have been dispersed by bats. During their feeding, bats swallow small seeds and so disperse them in their faeces great distances from the mother tree. When fruits are too large to be eaten rapidly, they carry them off to distant trees where they can feed safely, thus dispersing even large seeds tens to hundreds of feet away.

- Find out more about *Cecropia* and *Ficus*, two important groups dispersed by bats.

Discussion:

- Find out how man is endangering bats in other countries, and the knock-on effect this may have on people. Think particularly about destruction of the bats habitats.
- How many species exist on earth? *We don't even know* how many plants and animals share the earth with us. Scientists have estimated there could be anywhere between 5 million and 100 million species on the planet, but have only identified about 2 million. We cannot risk losing any species, as we just don't know how it fits into the web of life, or what other life is dependent on it.