



## Explore the world of bat conservation through the national curriculum

### Teachers' notes

# 3. BATS THROUGH THE YEAR

### Relevant areas of learning and experience:

*Science and Technology, Language, Literacy and Communication, Health and Wellbeing*

A life cycle is a series of growth stages that an animal goes through in its lifetime, through its birth and growth to a mature stage when it can reproduce and create a new generation. The stages suit the needs of each species. All mammals go through the same stages of growing up - birth, childhood and adult. UK bats have adapted to live in a temperate climate through an ability to survive without food for long periods, with their seasonal cycle very dependent on temperature

### Life cycle studies

- Use the development of bats to compare and discuss different stages in human development. Why are humans dependent on their parents for such a long time?
- Why does a pregnant or lactating bat need plenty of food?
- Consider and compare reproductive patterns in other mammals with those in humans.
- Compare the care of a bat mother with that of a human.
- Find out how other mammals care for their babies.
- Find out about the variety of homes parents build to protect their young.
- Compare dependence and independence in various mammals and other animals.
- Compare and contrast the development of a bat with two other mammals of your choice – perhaps a human and an elephant for contrast

### How long do bats live?

Bats can live a surprisingly long time for their size. Many bats die in their first year when they are in great danger as a young animal. Surviving their first flight and their first winter are big challenges. We only know the age of a wild adult if it has been ringed, using a numbered metal band. Many bats are known to live to over 20 years which is a very long time for such a small animal, though most will not live that long. The oldest bat so far recorded is a whiskered bat that had been ringed 43 years before.

- Find out the record age for humans and some other mammals?
- Most small mammals have large litters, so why do bats usually only give birth to a single baby?
- Why do young mammals never look exactly like their parents?
- Compare lengths of different stages in other animal species. Discuss the differences in capabilities of newly born humans and other animals. What is the difference between an animal's life cycle and its life span?
- Note. There is variation between species, and much we still have to learn

## Bats in winter

- What other British mammals have the ability to survive the winter without food for long periods?
- Make a clock calendar of a bats year. The day in the life of a bat can also be shown as a clock. Summer and winter 'clocks' will look very different.
- Make graphs or bar charts to show British temperatures through the year and in different years.
- Investigate the life cycle of insects—moths, gnats, midges. Relate this and their habitat to foraging bats and their seasonal requirements. Work out food chains and food webs.

## Temperature

Until the 1960s the Fahrenheit scale was the temperature standard for most purposes in English-speaking countries, based on a system proposed in 1724 by a German physicist Daniel Gabriel Fahrenheit after whom the scale is named. It uses the degree Fahrenheit (symbol °F) as the unit.

In the late 1960s and 1970s, the Celsius scale replaced Fahrenheit in almost all of those countries except the United States.

Celsius is the simplest scale to understand. Put simply, 0°C is the freezing point of water and 100°C is the boiling point of water. Centigrade is an old fashioned name for Celsius. The scale is named after Swedish scientist Anders Celsius (1701-1744).

## Activities relating to temperature

- Compare the range of temperatures shown on various thermometers— a room thermometer, a greenhouse max. & min. thermometer, a kitchen thermometer for jam-making, a soil thermometer? What else?
- Discuss the reasons for the differences.
- Make a plan of the school and school grounds. Make copies and record temperatures at fixed points through the day/year. Sensors are important aids in furthering our understanding of the needs of bats. E.g. the temperature in roost sites can be continuously monitored by the use of a temperature probe. Include temperatures in some holes or crevices if possible.
- Make tables, graphs and bar charts to compare temperatures in different parts of the school, inside and out.
- Where might it be suitable for bats to roost - in winter, in summer?
- Note the temperature of brick walls and tree trunks in relation to aspect.
- Where are temperatures most stable - an important factor for bats?
- Discuss how weather extremes may affect bats and other wildlife through the seasons—including cold summers and warm winters.
- Students can use sensors to detect light, sound and temperature around them and relate these to bats.
- Heat sensors can show the way in which people can raise the temperature in a room - relate to people going into hibernation sites such as caves, where it is important to have a stable temperature.
- Pupils can explore heat and temperature by watching a graph on the computer screen respond to the change of temperature in different places.

## Energy

- Develop the theme of making the best use of energy. Bats are described as heterotherms i.e. they can change their body temperature. Humans are homeotherms– we maintain a stable body temperature.
- We are unable to turn our own personal thermostats down, as bats do. How do we keep warm, or cool, as the weather changes? How can we make the best use of energy in the home?
- The incidence of twins in pipistrelles is higher in Scotland than elsewhere in the British Isles. Discuss the possible reasons for this. Clue: Find out more about the midges for which Scotland is famous.

## Investigate the diet of bats

Bats are unable to digest the chitin which forms the exoskeletons of insects; bat droppings consist entirely of insect remains which can look sparkly because of the chitin. They crumble easily, whilst mouse droppings, which look similar, are hard. If pupils find droppings or the local bat group is able to provide them, study them with a hand lens or microscope. It is often possible to identify which insects the bats have been eating.

**The table below gives a very general picture of the life cycle of a pipistrelle, though times depend partly on how much food the bats can find, and we're not even sure of some of the answers. Can you find out the answers for the 'humans' column?**

	pipistrelle bats	humans
<b>Gestation, the time a baby is growing inside the mother's womb.</b>	40-50 days	How long is gestation in humans?
<b>Birth weight</b>	Between a third and a quarter of mother's weight.	Ask one of your parents your weight when you were born
<b>First teeth appear</b>	Bats are born with tiny curved milk teeth	Can you find out when your first teeth showed?
<b>How often is a new born baby suckled on mother's milk?</b>	Many times when tiny, as baby clings on to mother when in the roost.	How often does a human baby need feeding each day?
<b>Starting to fly</b>	Three to four weeks	When does a baby start to walk?
<b>Catching some food, but still topping up with mother's milk</b>	When it starts to fly	When does a human baby start eating solid food?
<b>Weaned - no longer suckled by mother</b>	From about six weeks after birth	At what age is a baby no longer suckled or given a bottle
<b>Leaves the maternity roost</b>	About two months	When do young people leave home to look after themselves?
<b>Able to have babies and look after them</b>	Most at about one year old	When are humans ready to raise a family?

Choose two contrasting mammals (e.g. elephant and shrew), and make up a similar chart. Add a column for litter size.

- Which are the most vulnerable stages for each animal?
- How does this relate to mother/child care and longevity?