



# *Primary Science & Technology Bulletin*

Ideas and Inspiration for teachers in Primary Schools & S1/S2



*Investigating  
Owl Pellets*

*“Good things of day begin to droop and drowse; While night’s black agents to their preys do rouse” [1]*

As the days shorten and nights start to draw in and with the inevitable early approach of dusk our thoughts often turn to those creatures that come out to forage and hunt during the lengthening hours of darkness. When planning to study nocturnal animals, the very lifestyle of such creatures makes it extremely difficult to make meaningful observations and conduct investigations. However, there is a way of gaining an insight into the lifestyle of some of our most fascinating and elusive nocturnal birds, the owls. It is also perfectly possible to investigate their relationship with a number of their prey species without causing any disturbance to the birds or staying up half the night to observe them! This is possible through investigation of owl pellets, the undigested remains of an owl’s meal.

### Owl pellets

When asked to describe the diet of an owl children will often state that owls eat mice. But is this always the case? Do owls eat any other type of prey e.g. other rodents or small birds? Through

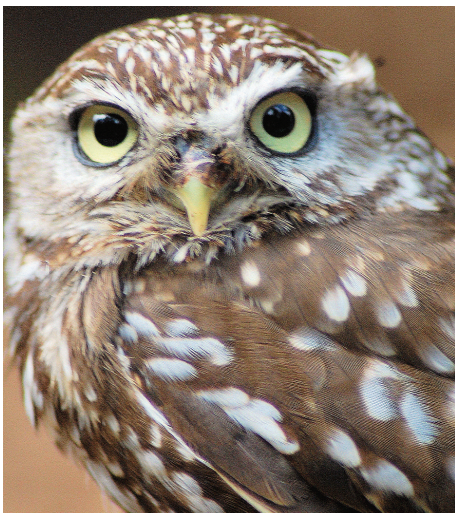


Figure 1 - Little owl.

the examination of owl pellets learners will be able to investigate these ideas. If pellets are obtained from a local source, the population of the prey species in the environment can also be investigated.

There are 5 species of owl resident year-round in the UK, the barn owl (*Tyto alba*), tawny owl (*Strix aluco*), long eared owl (*Asio otus*), short eared owl (*Asio flammeus*), and a 19th century introduction, the little owl (Figure 1) (*Athene noctua*). Interestingly the tawny owl and little owl are not found in Ireland. There are occasional migratory species spotted, as well as non-native escapees from aviaries; notably Europe’s largest owl, the eagle owl.

A number of popular books may serve as stimulus for younger learners, for example: “The Owl Who Was Afraid of the Dark” by Jill Tomlinson, “Owl Babies” by Martin Waddell or the Pat Hutchins classic “Good-night Owl!” The popularity of the Legends of the Guardians movies (based on the books by Kathryn Lasky) and the Harry Potter series of books and films means that a number of children will be familiar with owls. In particular, the snowy owl, Hedwig, companion to the fictional boy wizard.

The Principles and Practices for the sciences document [2] states that one of the main purposes of learning in the sciences is for children and young people to: ‘develop a curiosity and understanding of their environment and their place in the living, material and physical world’.

We believe that this dissection of owl pellets and related activities will foster a range of skills described in the Principles and Practice document and could contribute to learning and teaching for a range of the experiences and outcomes [3], including:

- I can explore examples of food chains and show an appreciation of how animals and plants depend upon each other for food. SCN 1-02a
- I can use my knowledge of the interactions between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area. SCN 2-02a

### What are pellets and how can they be obtained?

A number of types of birds produce pellets, including owls, other birds of prey, members of the crow family and gulls. As birds don’t have teeth they are unable to chew their prey and so often swallow their food whole or in large chunks. The softer parts of the meal are digested over a number of hours, but being unable to digest the bones, fur and feathers, the bird must get rid of these waste products. Rather than allowing the hard pieces of bone to enter the intestines, where they might cause damage, the bird squeezes the undigested remains together in its gizzard and regurgitates them as a pellet. The pellet is produced a number of hours after a meal and is often regurgitated at a roosting site. Many pellets may often be found at a single site. Owl roosting sites are often located on farmland and within older buildings.

Permission must be sought and safety must be of paramount importance when collecting pellets. Children should not be encouraged to bring pellets into class unless you can be absolutely sure that they have been collected safely and with the relevant permissions. It is well worth contacting your Local Authority as there may be a Countryside Ranger or Warden able to provide owl pellets for you to use. Some wildlife charities or historic building trusts may also be able to assist. We obtained our Barn Owl

pellets courtesy of *Friends of Sauchie Tower* [4] in Clackmannanshire.

Most bird pellets are characteristic in shape and size and their contents reflect and provide a fascinating insight to the diet of the particular species. In turn, the content of the pellets can also provide information about the prey populations in a particular area. The barn owl pellet is easily recognized by its glossy black colouration and size (around 4-6 cm) (Figure 2). A reliable field guide to pellet identification is useful if collecting from the local environment. For example, the guide [5] produced by the Field Studies Council. (Figure 3).

Please note that if you are collecting pellets from roosting sites, you must be aware of the strict laws surrounding the protection of wild birds and take care not to disturb or cause any distress, especially around breeding season.

## Investigating the pellets

Pellets must be sterilised before use as they often harbour the larvae of carpet moths, as well as other unwelcome visitors. If your pellets have been collected locally, you will need to sterilise them. Wearing rubber gloves, you should wrap each pellet loosely in aluminium foil. The pellets should then be placed in an oven at 160°C for 30 minutes or at 121°C for 15 minutes in an autoclave (your local secondary school may be able to help you with this). Pre-sterilised pellets can also be purchased from a number of sources, including the Barn Owl Trust [6].

Once you have obtained your sterilised pellets you can use your guide to identify the species of bird that produced them. The pellets should be labeled with the date, location and species and safely stored in a cool dry place away from contact with food or

drink. Pellets are best stored in cardboard boxes or paper bags, as they can develop mould if stored in plastic containers. Learners are usually very keen to act as nature detectives, and can't wait to start dissecting their pellet. However, if any learners are unwilling to take part they may wish to simply observe. As the pellet contains rodent fur there is a chance of triggering allergies, so checks should be made beforehand. Gloves can be worn during the procedure. As an alternative, a virtual owl pellet dissection is available on-line [7].

Before investigating the pellet, the work area should be clear and all food and drinks should be removed from the vicinity. Children should not put their fingers in mouths during the activity and hands should be well washed afterwards. Each group will need a disposable surface on which to work (e.g. a piece of card or laminate); plastic or metal tweezers (these can be disinfected after use, for example in Milton fluid); a cocktail stick or bamboo skewer to seek out small bones and teeth. Learners should take care with the sharp ends of these implements. We recommend that learners work in pairs, but this arrangement will depend on the number of pellets available and age of the learners taking part. For younger children an adult, or older pupil, could lead the investigation. A synthetic owl pellet aimed at younger children is also available. [8]

There are two methods of exposing the content of the pellets. The first method involves soaking the pellet in just enough warm water to cover it. A plastic container which can be disposed of afterwards is ideal. The warm water will soon soften the fur and the pellet will start to break up. The water can then be strained off and



Figure 2 - Barn owl pellet.

the materials retained in the strainer transferred to clean water from which learners can gently remove skulls, bones and teeth, using tweezers. This wet method works best if the pellet is old and hard. If the pellet is fresh then there is less need to soak it. The outer layer of fur can gently be removed with tweezers and the contents are soon revealed. Any unwanted fur and waste should be disposed of in the normal rubbish collection and work areas tidied.

In both methods, bones should be laid out on a separate piece of cardboard ready for inspection and identification. (Figure 4). These can then be classified and separated into skulls, jaws, ribs, etc. (Figure 5) This provides an easy



Figure 3 - FSC guide.



Figures 4 & 5 - Bones laid out ready for inspection and identification then classified in groups.

way to for learners to work out how many and what type of animals have been eaten. Skulls (especially jaw bones) and teeth form the basis for identifying the prey species. Voles can be identified by their prominent front incisors with a clear gap along the jaw bone leading to “zigzag” molars (Figures 6 and 7). These images were taken with our wee Veho USB-powered microscope – Bulletin

article coming soon. Mice and rats have more rounded molars, with rat bones being larger. Shrews are carnivorous and can be easily identified as they have no gap between their incisors and sharp canine teeth, the enamel of which is often coloured red. Learners might also wish to try to reconstruct a whole skeleton flat on cardboard, using glue to mount the bones. The bones can then be labeled ready for display.

The work could be extended if learners were to use the data they had collected to calculate how many small mammals are potentially eaten by the barn owl per night, week, month etc. The economic and environmental impact could also be considered as prey species are often vermin that farmers have to pay to eradicate. Another idea would be to construct a food chain/web in the form of a mobile or interactive display.

Barn owls are amazingly well adapted to their nocturnal (or more strictly speaking crepuscular) lifestyle. The ears of the barn owl are set asymmetrically with one ear opening placed higher and set further forward than the other. The feathers on its heart-shaped face are angled to direct any sounds towards the ear and so enable the owl to detect sources of the slightest sounds, a major advantage when hunting in the twilight. The flight feathers are also adapted to



Figure 6 - Vole lower jaw.



Figure 7 - Vole zigzag molars.

minimise the sound made when the bird hunts, again adding to its hunting success. Learners could compare and contrast the organs and senses used by nocturnal and diurnal animals as part of a number of topics.

No wonder so much folklore and legend surround owls; they are linked to many myths and stories throughout the world. The study of something as simple as the regurgitated remains of a meal can provide an insight into hidden world, one almost alien to our own diurnal adaptations.

References (all websites accessed 20th October 2011)

- [1] The Scottish Play.
- [2] [www.ltscotland.org.uk/Images/sciences\\_principles\\_practice\\_tcm4-540396.pdf](http://www.ltscotland.org.uk/Images/sciences_principles_practice_tcm4-540396.pdf)
- [3] [www.ltscotland.org.uk/Images/sciences\\_experiences\\_outcomes\\_tcm4-539890.pdf](http://www.ltscotland.org.uk/Images/sciences_experiences_outcomes_tcm4-539890.pdf)
- [4] [www.clacksweb.org.uk/community/friendsofsauchtietower/](http://www.clacksweb.org.uk/community/friendsofsauchtietower/)
- [5] Guide to British owls and owl pellets, available from Field Studies Council, £2.75, [www.field-studies-council.org/publications/pubs/owls-and-owl-pellets.aspx](http://www.field-studies-council.org/publications/pubs/owls-and-owl-pellets.aspx)
- [6] [www.barnowltrust.org.uk/infopage.html?id=249](http://www.barnowltrust.org.uk/infopage.html?id=249)
- [7] [www.kidwings.com/owlpellets/flash/v4/index.htm](http://www.kidwings.com/owlpellets/flash/v4/index.htm)
- [8] [www.amazon.co.uk/Owl-Pellets-Synthetic-Skeleton-Discovery/dp/B0053ZSS9M](http://www.amazon.co.uk/Owl-Pellets-Synthetic-Skeleton-Discovery/dp/B0053ZSS9M)