Using taxidermied animals to support the National Curriculum for Science, KS1-4

These notes have been produced to help you think about how you can make use of taxidermied animals ('stuffed animals') in museums to support teaching of the National Curriculum. Taxidermied animals are some of the most widespread and spectacular natural history specimens. They present a wealth of opportunities to support learning in a wide range of different subjects. They also afford an excellent opportunity for students to learn in different ways, and to support groups of students with diverse educational needs.

Some background about taxidermy

Taxidermy means 'arranging skins'. Taxidermied animals generally consist of a real animal skin, arranged to look like the animal that once owned them. They tell us something about animals, about the people who made them, and about our modern society. So, whether you love them or hate them, taxidermied animals provide particularly rich opportunities for students to explore subjects, to form opinions and take part in discussions and debates.

Old taxidermy usually involved chemical preservatives, including arsenic that was applied in a soap-like paste to the inside of skins. Because of this, and because you can't be certain what chemicals have been applied to old taxidermy, it is advisable not to allow people to handle old taxidermy without protective gloves. It is probably fine to include old, uncased taxidermy as part of demonstration sessions that don't involve disturbing the hair or feathers. Taxidermied animals in smaller display cases (tableaux that used to be in private collections) should be fine for inclusion in public events, so long as you take care to protect the glass (which is thin and is often attached using only paper tape). If you want people to be able to handle taxidermied animals as part of educational sessions or public events, it is easy to purchase modern pieces made to order from taxidermists (see the Guild of Taxidermists' website for contact details).

Science

Just for the benefit of those who are not familiar with science, science is made up of two main elements. The first of these is the gathering and build-up of reliable information, based on observation and data collection: no data, no science. In terms of biology, that means 'natural history': sightings, observations, that kind of thing. The second is the ongoing build-up of tried and tested ideas, based on questions that can be answered by investigation. Scientists make a prediction (a hypothesis) and test whether that is

correct or not. Science is an ongoing, reflective process. It is made up of the best evidence available, and it is never finished. It differs from personal opinion in that it aims to describe the world around us, to be replicable, and to be evidence-based. The common misunderstanding of science is that it is based on absolute certainty: it's not, it accepts that the answer is the best we have so far, based on the evidence available to us. Science is extremely creative, as it involves the formation of smart questions that can answer particular problems.

Taxidermy specimens in museums provide an excellent source of information and inspiration to support students' learning as part of the science curriculum, notably in terms of the variety of life, adaptation and evolution, and of the inter-relationships between living things. Investigative and questioning approaches could be used to support students to **work scientifically**, by asking questions and making predictions (hypothesising) about what they see, and based on investigations of specimens that supplement those seen on display. Students are supposed to 'experience and explore a wide range of phenomena' and use 'first-hand practical experiences', both of which fit well with the museum experience.

Science, Key stages 1-2

Animals, including humans

Years 1-2

-Students **identify and classify** animals on display
-Students **explore the similarities and differences** of animals that are classified together
-Students **explore the position of organs** such as the eyes, ears, nose and feet, to support understanding of how these are positioned in relation to one another
-Students use specimens on display to **find animals from different parts of the world**
-Students use specimens on display to show students **a range of animals**, including amphibians, reptiles, fish, birds and mammals
-Students have to **find specimens with particular diets**, whether carnivorous, herbivorous or omnivorous
-Students **classify animals on display** in a museum, and give explanations of the basis on which they have grouped them, whether by eg. diet, pattern or colour, size, or morphological similarity to one another
-Students use taxidermied specimens to **explore pattern and texture** of animals, and use this as a basis for exploring how those animals might live
-Students are given different patterns found on animals on display and are **encouraged to predict** how those patterns might relate to how those animals live, to promote imagination and working scientifically (forming hypotheses)
-Students explore how **museum specimens are a resource used by scientists** to study the variety of life and where particular species live

-Students explore how **museum specimens are a form of evidence** of what lived where at particular times
-Students **explore which parts of specimens** could be measured by scientists to study variation
-Students are **shown behind-the-scenes collections** in museums to show that museums are a kind of encyclopaedia of nature

Year 3

-Students choose **animals of different shapes and explore how those animals might move**, and how those movements would impact on the animals' lives
-Students **select different diets** and explore the implications of those diets for animals. How much would they need to eat? What size do they need to be to have that diet?
-Students **explore very small and very large animals**. What implications do their sizes have on the amount of energy they need, how they generate and maintain heat and temperature, where they could live, how fast they could move, how long they would need to live to grow to that size.
-Students examine taxidermied animals and then **work with bones, horns and skulls** of the same species to measure variation in size or shape

Year 4

-Students **explore specimens of animals with different diets and different organs for digesting food**. These could include

antelopes, cows, sheep etc. that chew the cud and have four stomachs

-Students **explore the skulls of animals** they have seen on display, to examine the different types of teeth they have and to suggest reasons for this. Students could also be given worksheets describing an animal with a particular diet and lifestyle, and students have to draw or otherwise represent the animal, and then see how their answers match up with real animals, to be seen on display

Year 5

-Students **work scientifically by exploring the lifespans of different animals seen on display**, and plot a graph of their lifespan against their weight. They are given the weight of some imaginary animals, and have to predict their lifespan from the graph they produced

Living things and their habitats

Years 1-2

-Students use displays of animals from a particular habitat to **explore that habitat**

-Students **investigate animals from hot and cold climates**, or different habitats, to explore life in that habitat

-Students use museums to differentiate between things that are **alive, dead and that were never alive** (can be very easily done in museums that include live animals)

-Students use specimens to find **young and old animals**, and families of animals

-Students use specimens to **explore how animals grow**: how horns grow over time, for example

Year 4

-Students use displays of taxidermied animals to **classify animals** according to structure, lifestyle and/or habitat, and can produce or use keys to do so

-Students use displays of taxidermied animals to **explore changes in the numbers of particular species**, especially if the museum displays include rare and/or extinct or endangered species

-Students explore the measures that people have taken to **protect and preserve particular species**, based on animals on display and on further research

-Students use museum specimens to **explore changing attitudes to animals**, for example persecution of carnivorous mammals and birds of prey in Britain, or big game hunting in Africa, Asia and North America, using trophy heads of mammals

-Students use specimens on display to **explore how populations of animals change over time**, and explore the reasons for these changes. Students explore the impact that people have had on particular species

Year 5

-Students **explore specimens scientifically, by taking measurements** of the animals' bodies, feet, ears, tails (probably of specimens to supplement those seen on display)

-Students **make graphs of the relative length** of one part of an animal's body to another, or students are provided with the weight of an animal and they plot the size of appendages against this

-Students could **investigate ecological laws**, that animals from cold climates have relatively smaller extremities (tails, ears), or that animals from cold climates are larger than their close relatives to retain heat

-Students **use specimens of bones and horns of animals seen on display to make predictions** and suggest methods for testing them

-Students **explore the lifecycles** of birds, mammals, amphibians and reptiles, based on specimens on display and accompanying specimens. Which lay eggs? Which have external/internal fertilization?

Year 6

-Students **group animals seen on display**, and relate them to a taxonomic key. They could be shown how classification of animals works like a set of Russian dolls, with increasingly similar and closely related animals in smaller and smaller groups. Students could be given particular animals to classify, with some description of their main features.

-Students use the layout of museum cases to encourage students to **'invent' a museum display**, with animals placed with their closest relatives

-Students are **introduced to the work of Carl Linnaeus** and relate it to the **scientific names** that are usually seen on museum labels

Evolution and inheritance

Year 6

-Students **explore the adaptations** of particular specimens, and compare them with similar species. How do the features of a species fit with its lifestyle? Show students closely related but dissimilar species. How is each suited to its lifestyle? What might a common ancestor have looked like?

-Students can also **compare and contrast the adaptations of animals with similar lifestyles**, but that aren't closely related. Compare the wings of birds and bats, for example, or compare the patterns of animals that live in the open Arctic, or on African grasslands, or in jungles and forests.

-Students combine examinations of displays of taxidermied animals with those of fossils to show that **species change over time**

Sound

Year 4

-Students could be **played recordings of the calls of animals** they see on display, and explore the reasons for the production of these sounds, and the mechanisms involved

Seasonal changes

Years 1-2

-Students use taxidermied specimens to **explore seasonal changes**. Take Stoats or Mountain Hares that turn white in winter, or birds that moult into plainer plumage in winter

-Students **explore the lives of migratory birds** such as Terns and Swallows. Why would insect-eating birds have to migrate to survive?

Science, Key stage 3

-Students **explore foodchains**, to illustrate that photosynthesis is the basis of almost all life on earth

-Students **explore the effects of particular species on their environment**, using taxidermy dioramas to explore animals in their habitat. What do they eat? What affects the numbers of the things they eat? What would changes in habitat or climate mean for the numbers of particular species?

-Students **use taxidermy displays to explore differences between closely related species**. How do they differ from one another, and what reasons might there be for these differences?

-Students **explore biodiversity**, in terms of how many species there are living in different habitats

-Students **explore the interdependence of species on display** and in communities

-Students **explore rare species** that have had changes in numbers due to pollution and pesticides (eg. Peregrines and Sparrowhawks)

-Students **explore the use of museum collections** as archives of the natural world, and the uses that can be made of them to **support nature conservation**

-Students **examine methods of extracting DNA** from museum specimens

Science, Key stage 4

(based on consultation draft document)

-Students explore specimens of **species that spread diseases**, including Black Rats

-Students **explore trophic levels in an ecosystem**, from primary producers to top carnivores, and explore nutrient cycling

-Students **explore their own place in nutrient cycles**, exploring their own consumption and production of materials and gases

-Students **identify and apply methods for distinguishing between species**, using field guides to identify specimens seen in museums

-Students **explore positive and negative human interactions** with various ecosystems, exploring the changing status of particular species seen on display

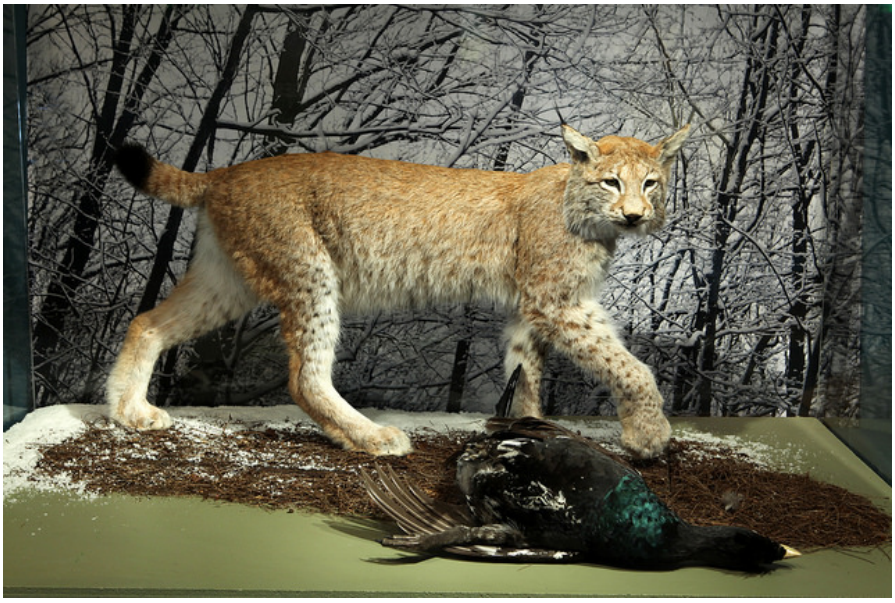
-Students **explore the history of big game hunting** and persecution of animals, and other human-wildlife conflict situations

-Students use the overall museum collection to **begin to explore biodiversity**, and what it means at population, species and community levels

-Students **explore human impacts on biodiversity** by studying extinct or endangered animals
-Students **explore the interactions between species** seen on display, exploring the obvious and indirect effects that they have on one another
-Students **explore variation** between the individuals of a species. They may be able to work scientifically by studying bones of specimens seen on display
-Students **explore the evidence of evolution** by natural selection, using a 'whodunnit' of fossils, internal structures, and adaptations
-Students **explore evolution by natural selection** by considering the life of a particular species seen on display. How many young does it produce? How would its numbers increase over time if they went unchecked? How does it vary?
-Students se specimens on display to **illustrate changing methods of classifying species**
-Students use taxidermied animals as part of **investigations into the changing environment**. How would scientists know how many there were in the wild? What methods would they use to count them, and to explore changes in population sizes or distribution

These notes have been produced to show the diverse ways in which you could include taxidermied animals as part of educational visits to museums. If you have other ideas, that's great, as these notes are not intended to be exhaustive.

Hopefully these notes will help support you in your work, or at least to show that far from being irrelevant, taxidermy specimens have enormous potential. Good luck!



These notes have been produced as part of a programme of support for North West museums with natural history collections, led by Manchester Museum in association with World Museum Liverpool, Tullie House Museum and Museum Development North West. If you have any comments, please email henry.mcghie@manchester.ac.uk