



Mammal Feet, Toes & Tracks



By Susanna Ramsey & Derek Crawley



Registered Charity No 278918. Support our work at mammal.org.uk





Weasel

Index



Harvest mice

Adaptation & Classification	Page 3
Plantigrades	Page 3 & 4
Digitigrades	Page 5
Unguligrades (Hoofed Mammals)	Pages 6 & 7
What about Us?.....	Page 8
Land Mammals: Number of Toes, Tables	Pages 9 & 10
Cetaceans (Whales & Dolphins)	Page 11
Pinnipeds (Seals)	Page 12
Chiroptera (Bats)	Page 13
Number of Toes Table	Page 14
Mammal Tracks	Pages 15 & 16
Mammal Track Photos	Pages 17 & 18
Footprint Tunnels	Page 19
Tracks in Footprint Tunnels	Page 20
Search for Animal Tracks	Page 21
Mammal Foot Photos	Page 22
Photos of Wood Mouse Foot Bones	Page 23
Photos of Vole and Mole Foot Bones	Page 24
Activities for Children	Page 25
Further Research	Page 26



Stoat

Mammal Feet & Toes



Red squirrel

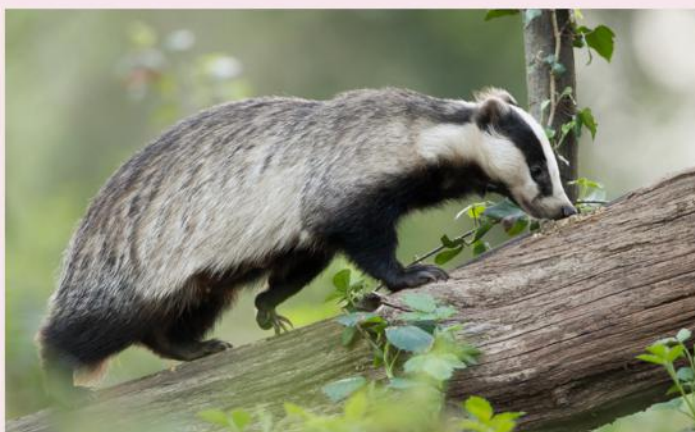
Mammal Adaptation and Classification

The first mammals, who lived alongside the dinosaurs, were small, shrew-like creatures with five toes on each foot. They walked on all four legs, pressing down on the whole foot as they went.

Plantigrades

Today, millions of years later, many mammal species still have five toes on each foot and walk flat-footed, with their wrists/heels touching the ground.

Examples are humans, badgers, stoats, weasels, mice, squirrels, rabbits and hedgehogs although rodents now have just four toes on the front foot and five on the back.



Badger



Hedgehog

These animals are known as '**plantigrades**', which means *walking on the sole of the foot*. Frogs and lizards, which are not mammals, are also plantigrades.



Mole

Mammal Feet & Toes



Brown hare

Plantigrades



Brown rat. A **plantigrade**. Walking with the whole foot touching the ground



Rat skeleton

But the flat-footed walk is a slow and inefficient way to move.



Rabbit



Weasel



Wood mouse



Red squirrel

As mammals developed into hunters and prey, the need for speed led, for many species, to the lengthening of the leg bones, a reduction in the number of toes, the body weight shifting forward and a move up onto their tiptoes or hooves.

Mammal Feet & Toes



Fox



Wildcat

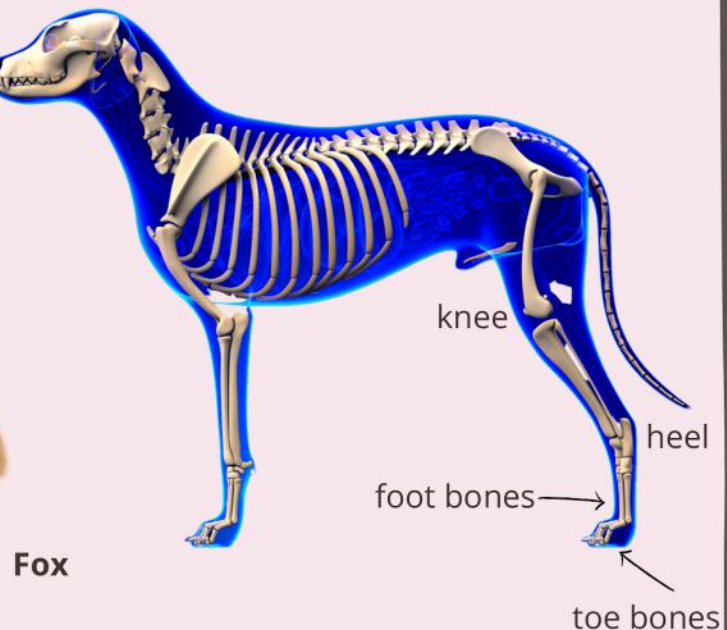
Digitigrades

One group of animals evolved to stand, walk and run on their toes. Their leg bones got longer and the long bones in the hand/foot acted like a third section of the leg, increasing their height, spring and stride. The inner digit, equivalent to the big toe, lost contact with the ground, reducing friction.

These animals are classified as '**digitigrades**', which means *walking on the fingers/toes*. Examples are wildcats, foxes and pet cats and dogs.



Wildcat



Fox

For some, like cats and dogs, the unused digit on the front legs became the small 'dew claw'. You might see it on your pet.



Fallow deer

Mammal Feet & Toes

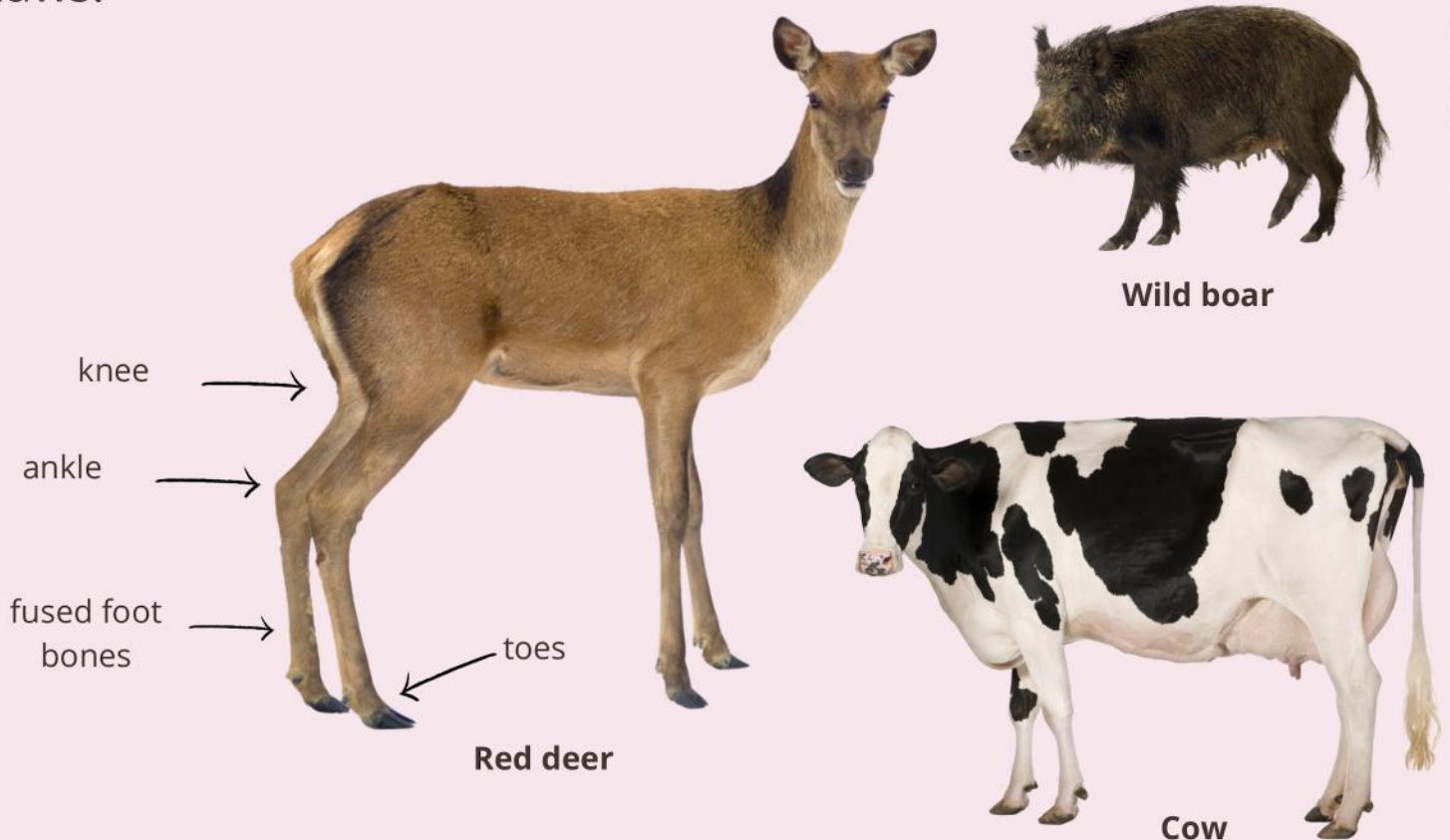


Wild boar

Unguligrades

The feet and toes of other mammals evolved even further in this direction. The hand/foot bones of the third/fourth finger fused to become a third section of the leg. The animals rose up to walk just on their claws, which became solid, weight-bearing hooves. These animals are classified as '**unguligrades**', which means *walking on their finger/toe-nails!*

One group of unguligrade animals, has **two toes** on each foot. This group includes deer, wild boar, cattle and sheep. They are '**artiodactyls**', which means *even-toed*. They also have dew claws.





Wild pony

Mammal Feet & Toes



Wild pony

Unguligrades

Another group of unguligrades evolved to have **one or three toes/hooves** on each foot. These are '**perissodactyls**', which means *odd-toed*.

Horses are perissodactyls, having just one hoof on each leg.



Horse



Tapir



Rhinoceros

Rhinos and tapirs, not British mammals, are also perissodactyls, with three toes on each leg!



Human feet

Mammal Feet & Toes



Humans walking

What about Us?

Humans are plantigrades. We walk on two flat feet. Many other mammals walk on four feet.

We use our front limbs and hands for different functions like holding and gripping, carrying, using tools and making things. We use our toes to help us balance and grip the surfaces, when we are walking or climbing.



We cover our soft feet with socks, shoes and boots. Other mammals have thick, tough pads on the soles of their feet for protection against knocks and scratches.

We have finger and toe nails. We might even paint our nails! Most other mammals have claws which they use to dig, grip, scratch up food or kill. Some mammals have hooves. Nails, claws and hooves are all made of keratin, like hair, feathers and fur.



Land Mammals Feet & Toes



Otter



Sheep

- **Plantigrades**, walk on the soles of their feet
- **Digitigrades**, walk on their tip toes
- **Unguligrades**, walk on their toe-nails/hooves



Beaver

Within the group of Unguligrades, there are **Artiodactyls**, even-toed animals and **Perissodactyls**, odd-toed animals.

Plantigrades	Digitigrades	Unguligrades
humans, 5,5*	cats, 4,4	deer, 2,2
badgers, 5,5	dogs, 4,4	horses, 1,1
mice, rats, voles, 4,5	foxes, 4,4	cattle, 2,2
rabbits and hares, 5,5		sheep, 2,2
bears, 5,5		goats, 2,2
beavers, 4,5		wild boar , 2,2
hedgehogs, shrews, 5,5		
otters, 5,5		

(* number of toes on front and back feet)



Wood mouse

Land Mammals Feet & Toes



Pygmy shrew

Species	Classification	Toes on front foot*	Toes on back foot
Badger	Plantigrade	5	5
Fox	Digitigrade	4*	4
Rabbit	Plantigrade	5	5
Horse	Unguligrade	1	1
House Mouse	Plantigrade	4	5
Roe deer	Unguligrade	2*	2
Wildcat	Digitigrade	4*	4
Pygmy Shrew	Plantigrade	5	5
Otter	Plantigrade	5**	5**
Wild boar	Unguligrade	2*	2

*excluding dew claws

** webbed

Note: All rodents have 4 toes on the front foot and 5 on the back



Killer whale

Mammal Feet & Toes



Common dolphin

Cetaceans

Other mammal species evolved different ways of moving with their hands and feet.

Whales and dolphins live in the sea. They lost their back legs and feet altogether. Their front legs and hand bones turned into flippers. They are '**cetaceans**', which means *sea creatures*.



Humpback whale

Bottlenose dolphin

If you look at a cetacean skeleton, there are front leg, hand and finger bones but on the outside, all we see is the large flipper. They do not have separate toes.



Whale skeleton



Grey seal

Mammal Feet & Toes



Grey seal

Pinnipeds

Seals still have front and back legs and feet, which have become flippers. They are '**pinnipeds**', which means flipper feet.



Common seal

Seals have toes and long claws on their front feet. These claws are used to defend themselves, to groom and to climb out of the water. Seals also have small claws on their back feet/flippers, halfway down the toes!

Like beavers and otters, seals have webbed back feet, which propel them faster through the water.



Seal's front feet



Seal's back feet



Greater horseshoe bat

Mammal Feet & Toes



Pipistrelle bat

Chiroptera

Bats have gripping feet for hanging onto perches. They actually sleep, hanging upside down. Their arms and hands have evolved into wings. They have incredibly long finger bones. They are '**chiroptera**', which means *hands as wings*.

The wing membrane stretches over the arm and finger bones. You can see the bones in the photo below.



Grey long-eared bat

Bats have relatively short legs. They move by flying rather than walking. They can crawl up a tree trunk or across the ground, if necessary but are very clumsy.

The wing membrane also stretches across the back legs and over the tail. Only the feet and claws extend beyond the wings.



Illustration to show bat wings and limbs



Outline of bat from behind, showing wings and limbs



Beaver

Mammals

Number of Toes



Highland cow

Species	Classification	Number of Toes on Front Foot *	Number of Toes on Back Foot
Beaver	Plantigrade	4	5**
Noctule bat	Chiroptera	5	5
Horse	Unguligrade	1	1
Cow	Unguligrade	2*	2
Grey seal	Pinniped	5	5**
Roe deer	Unguligrade	2*	2
Wildcat	Digitigrade	4*	4
Shrew	Plantigrade	5	5
Whale	Cetacean	0	0
Polecat	Plantigrade	5	5

*excluding dew claws ** webbed



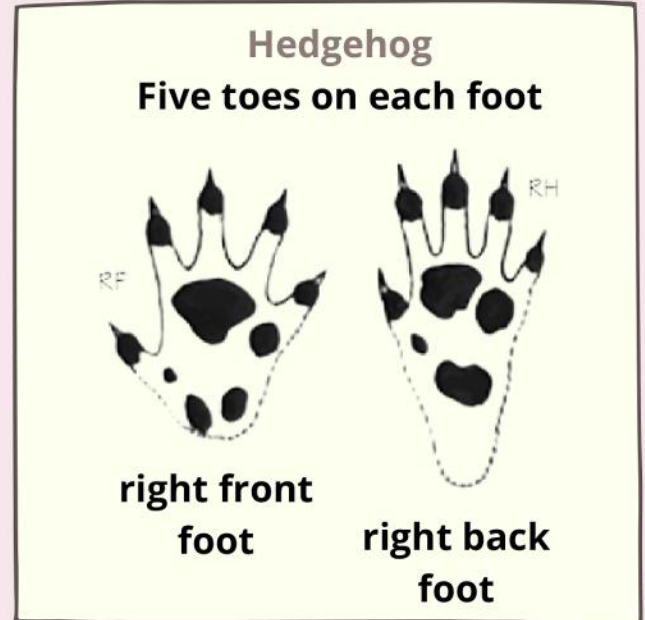
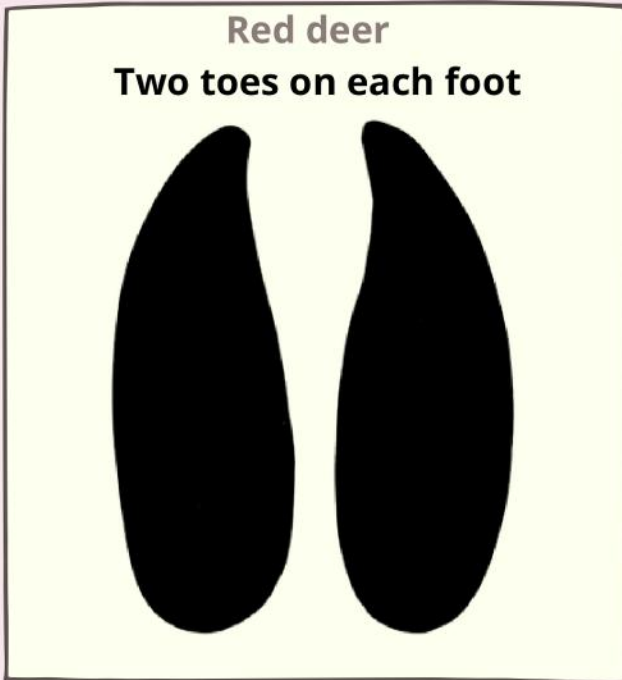
Red deer

Mammal Tracks

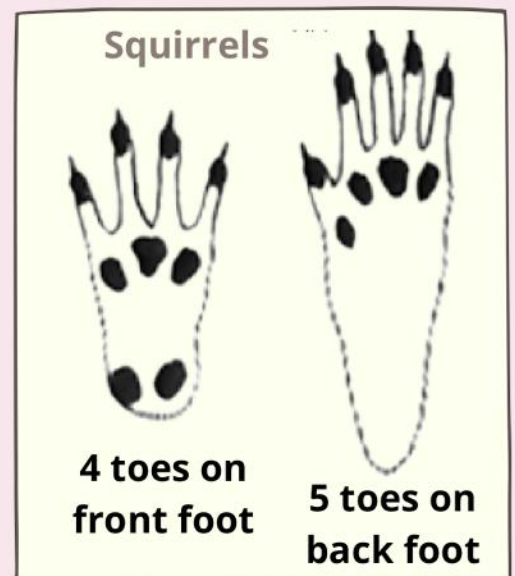
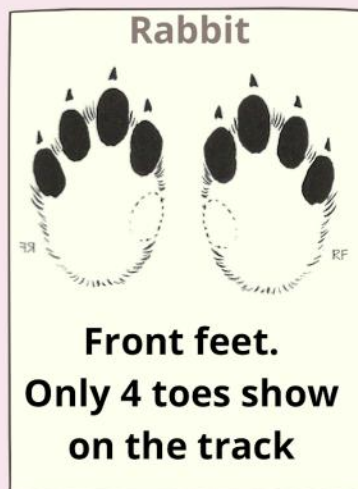
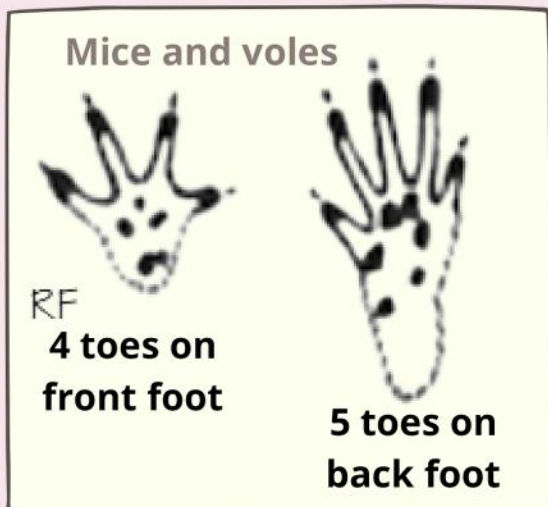


Hedgehog

You can count the number of toes on the animals' tracks.



Dew claws and some toes don't show on the track because they don't touch the ground. Rabbits and hares have five toes but only four show on their track.



Note the long back foot, for pushing off!

Track drawings are the copyright of Gillie Muir & Pat Morris



Dog

Mammal Tracks



Lamb

Digitigrade

Fox
4 toes on each foot



Digitigrade

Dog
4 toes on each foot



Digitigrade

Cat
4 toes on each foot



No claws show on the track

You can draw a cross between the toe pads of the fox print without touching the triangular pad. You can't do this with a dog print.



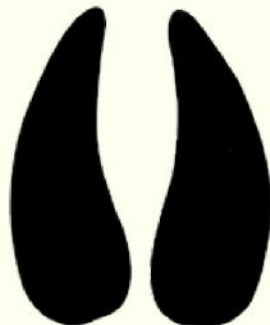
Plantigrade

Badger
5 toes on each foot



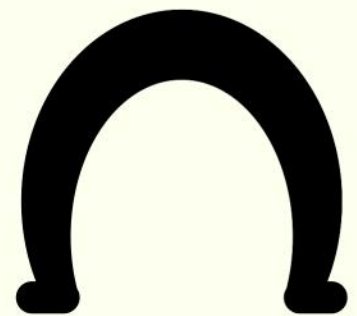
Unguligrade

Sheep
2 toes on each foot



Unguligrade

Horse
1 toe on each foot



Track drawings are the copyright of Gillie Muir & Pat Morris, except the horse



Otter

Mammal Track Photos



Grey squirrel

Animal Tracks

Here are some tracks which were spotted and photographed by Derek Crawley.



Squirrel prints in snow, with pen for scale



Squirrel prints in mud, with 10p coin for scale



Otter (large) and mink (smaller) prints in mud with £1 coin.
Note the 5th toes do not always show



Otter (large) and bird (smaller) prints in snow, with 50p coin for scale



Badger

Mammal Track Photos



Fox

More Animal Tracks!



Badger prints in mud, with £1 coin for scale



Badger prints in snow. Note human boot print!



Fox prints in snow, with tape measure



Roe deer prints in mud, with £1 coin for scale



Hedgehog

Footprint Tunnels



Field vole

Collecting Tracks in a Footprint Tunnel

A footprint tunnel is a good way to find out which small mammals are in an area.

Line the tunnel with white A4 paper. Put some tempting food in the middle with animal-friendly ink pads on either side. Small mammals enter the tunnel to get the food, enjoy a treat and leave their footprints behind!

Because the surface in the tunnel is hard, the animals' feet do not sink in as they do in mud or snow, so the track they leave is different, with the pads showing.

Follow this link to [Wild South](#), to find out more.



(C) Wild South



Rabbit

Tracks in a Footprint Tunnel



House mouse

Here are some tracks collected from a footprint tunnel!

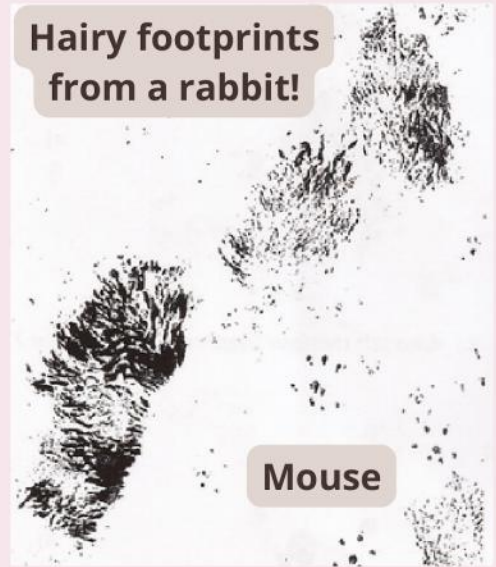
Shrew. Note the tail print!



Hedgehog



Hairy footprints from a rabbit!



Mouse



Mouse



Robin

Blackbird



(C) Rob Strachan



Wood mouse

Search for Tracks



Fallow deer

Search For Animal Tracks!

Why not look for some animal tracks yourself?

You could use the **Field Studies Council (FSC) British Mammal Tracks and Signs Guide** to identify the tracks you have found. Or get the **Mammal Society guide How to Find & Identify Mammals** by Gillie Muir & Pat Morris.



If you do find any mammal prints, please report these data to the **National Mammal Atlas Project** or use the **Mammal Mapper** smartphone App.





Water shrew

Mammal Foot Photos!



Water vole



Hedgehog



Red squirrel



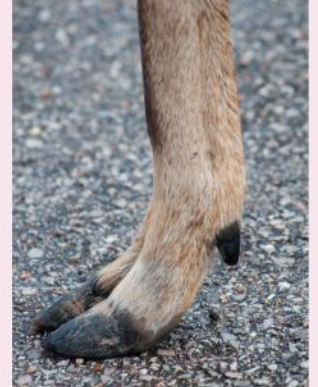
Grey squirrel front foot - 4 toes



Horse hooves



Badger claws



Deer hooves + dew claw



Weasel



Polecat



Otter



Wood mouse

Photos of Tiny Wood Mouse Foot Bones



Human hand x-ray



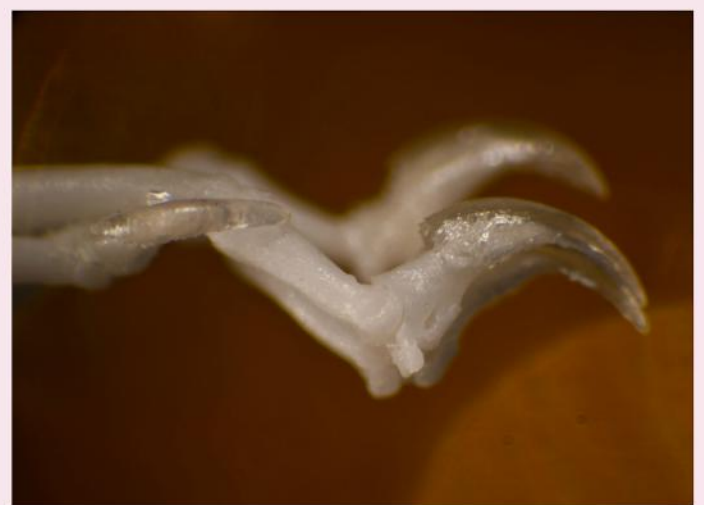
Wood mouse front foot bones - from above and below.
The whole foot is just 7mm long x 2mm wide!



Wood mouse back foot bones - from above and below.
The back foot is much longer, 19mm long x 3mm wide



Back leg, heel and foot, side view



Transparent claws, just 2mm long!

Photos by Susanna Ramsey, [The Nature Collection](http://TheNatureCollection.org)



Mole

Photos of Vole & Mole Foot Bones



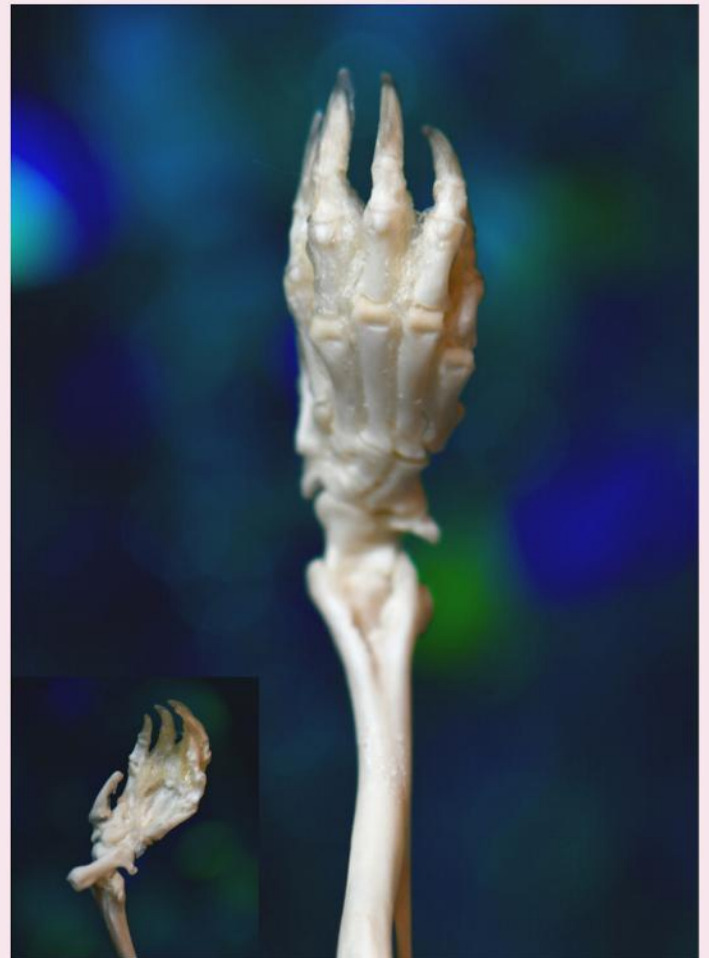
Human foot x-ray



Delicate field vole back foot bones - from above and below. Designed for speed!
The whole foot is 15mm long x 3mm wide. Broken one toe in the left photo



Mole front leg and foot bones. Adapted for digging! Foot is 18mm long x 15mm wide



Mole back leg and foot bones
Foot is 16mm long x 6mm wide

Photos by Susanna Ramsey, [The Nature Collection](http://TheNatureCollection.org.uk)



Registered Charity No 278918. Support our work at mammal.org.uk





Wood mouse

Activities for Children



Red deer

To encourage children to have fun with this topic, make sure you download or look online at the **Activities Section on Mammal Feet, Toes & Tracks.**



It contains: a Venn Diagram, 2 x Bar Charts and Match the Track and Draw the Track resources, all about UK mammals and their toes!



Mammal Feet, Toes & Tracks
Activities
By Susanna Ramsey & Derek Crawley

The Nature Collection Registered Charity No 278918. Support our work at mammal.org.uk Mammal SOCIETY





Brown hare

Further Research



Roe deer

Click on this link to The Mammal Society website to find out more about UK mammals.



Mountain hare

The Mammal Society: Full Species Hub

The British Isles are home to around 90 species of mammal in the land, sea and air. Click on the hare photo to access the Hub and discover more about these mammals.

Click on this link to discover more resources and activities on the Mammal Youth Hub.



Harvest mouse

The Mammal Society: Mammal Youth Hub

If you are a mini mammalogist or a teacher inspiring your class about the wonderful world of mammals, take a look at the resources on the Mammal Youth Hub! Click on the harvest mouse photo.

Click on this link to The Nature Collection.



Wood mouse back foot bones

The Nature Collection

If you want to learn more about all kinds of UK animals, looking in particular at their skulls and skeletons, click on the bones photo.

