LONGLEAT

Koala Creek

LEARNING with LONGLEAT

Activity Pack

Koala Creek at Longleat

Koala Creek opened in Spring 2019 and is home to a number of Australian animal species.

- Southern koala
- Hairy-nosed wombat
- Long-nosed potoroo
- Macleay's spectre stick insect (seasonally)

In addition to the animal areas there is also the opportunity to look into our *Eucalyptus* preparation room and to see one of the crates that the koalas travelled in from Australia. Within the exhibit, there are educational graphics panels, which cover:

- Information about marsupials
- Types of koalas and where they come from
- Koala and wombat adaptations (including replica koala skull)
- *Eucalyptus* species
- How koalas are affected by climate change
- Our work with the Koala Life

A video presentation shows the koalas' journey and the importance of the work being done to help the species.

Enthusiastic keepers, based in Koala Creek, are more than happy to answer questions and tell you more.

For younger audiences, a storybook is available in the shops around the park called, 'Welcome to Longleat, Dennis'. It tells a story of Dennis, our male koala, as he makes his way around Longleat to his new home, interacting with other animals along the way.

Our Lead Koala Keeper Jon also read "Welcome to Longleat Dennis" as a bedtime story. Click here to watch

Visiting Koala Creek with your students is a great way to bring their curriculum work to life. The educational talks offered in this area are Koala Creek (**KS1,2,3,4,5**) and Koalas and Climate Change (**KS2,3,4**)

It is particularly good for areas of the science curriculum for **KS1**, **KS2** and **KS3**; including adaptation, grouping animals and environmental change.

If you would like advice planning a visit to Koala Creek, or to find out how it could link with your planned topics, please get in touch education@longleat.co.uk

Marvellous Marsupials

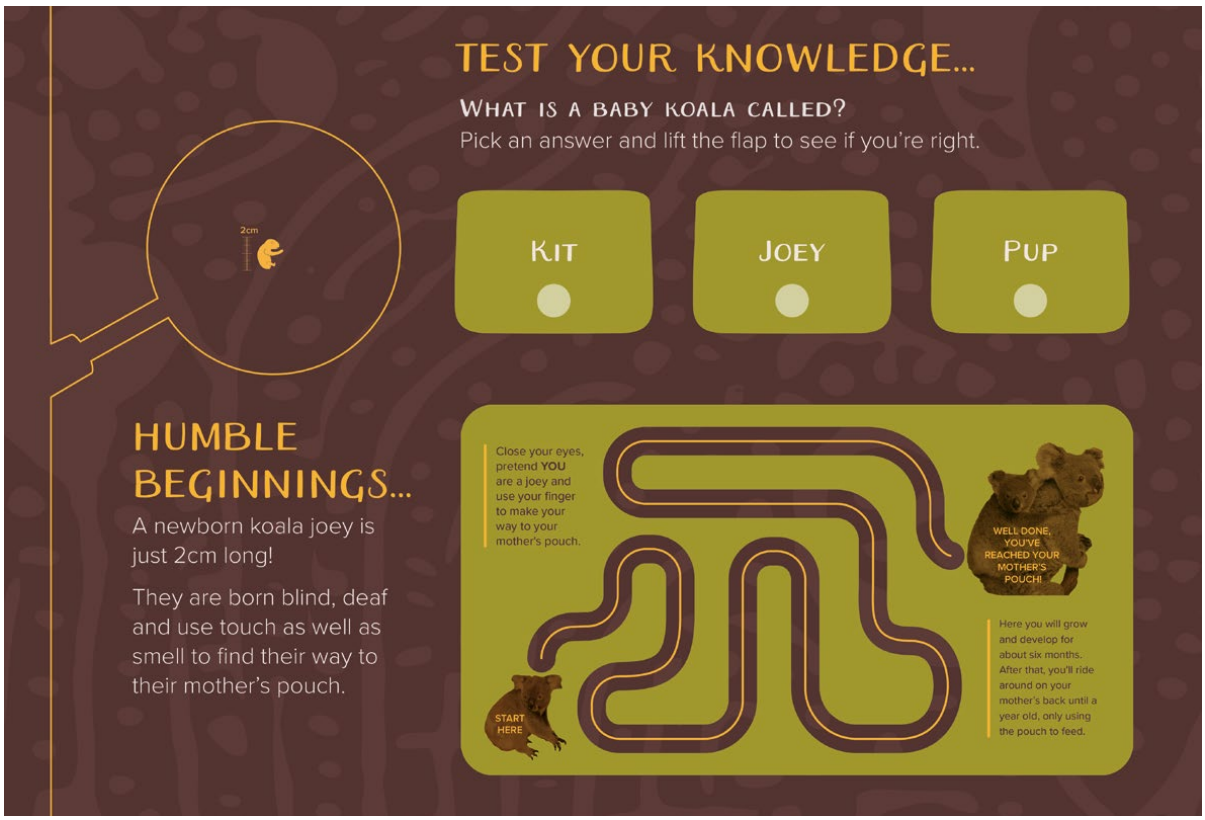
What is a marsupial? Marsupials are a group of mammals characterised by an unusually short pregnancy; where females typically have a pouch within which their young develop. Koalas, wombats and potoroos are all marsupials. Other marsupials include kangaroos, possums and wallabies. The majority of mammals in Australia are marsupials. Some marsupials are also found in other parts of the world such as the Americas and New Guinea.

Despite often being referred to as 'koala bears', koalas are not bears, they are marsupials. It is due to their teddy bear-like appearance that they were first thought to be bears and many people continue to think they are.

Marsupial young are referred to as joeys. A newborn koala joey is just 2cm long. They are born blind, deaf and use touch as well as smell to find their way to their mother's pouch. To help with this their forelimbs and head are more developed than the rest of their body. They move with swimming movements through their mother's fur. Once in the pouch, they will grow and develop for about six months. After that, they ride around on their mother's back until a year old, only returning to the pouch to suckle milk.

Whilst at Longleat...

In Koala Creek there is a 'Marvellous Marsupials' interpretative panel that the students can interact with. Koala Creek is home to most of the marsupials we have at Longleat but you could set your students the challenge of looking for more... **Clue:** look in Family Farmyard.



In the classroom...

How many animals?

Talk to the class about how many different types of animal they think there are in the world (some scientists estimate 30 million!). Explain that to make it easier, scientists have sorted them into different groups – classified them. How you explain this and the terminology you use will depend on the age of your students.

Sorting animals into groups

Print and laminate a number of photos of animals, include 10 x invertebrates, 4 x mammals (include koala) 4 x birds, 4 x reptiles, 4 x amphibians, 4 x fish. The animals you pick will allow you to differentiate the activity. For KS3 students you could include an egg laying mammal such as a platypus. A turtle often causes confusion, because of its behaviour; students will often put it in with amphibians rather than correctly identifying it as a reptile.

The majority of the world's species are invertebrates (with no backbone) so first ask the students to divide the photos into two groups: those with bones and those without. Use the terms vertebrate and invertebrate. Invertebrates are then divided into many different divisions, however the vertebrates can be divided into five;

- **Mammals**: feed their young on milk, majority have hair or fur, majority give birth to live young
- **Birds**: have beaks, covered in feathers, lay hard-shelled eggs
- **Reptiles**: covered in scales, lay soft-shelled eggs
- **Amphibians**: have moist or slimy skin, jelly-like eggs that need to remain moist to survive and not dry out, majority have lifecycle that requires water
- **Fish**: have scales, have gills to breathe in water, majority lay jelly-like eggs; students may be familiar with sharks and know they don't (note: there is a lot of diversity, and several groups of animals are grouped together to be known commonly as 'fish').

Ask your students to divide the vertebrates into five groups. If they are struggling it is often easiest to start with a bird, which is familiar. Identify why they know it is a bird. The idea of the activity is to get them thinking about how animals can be grouped. It is worth noting that this has changed over time and is still changing as scientists find out more about species.

Once they have had a go at sorting the photos into vertebrate groups, talk to them about how these groups may further divide e.g. reptiles into snakes/lizards, crocodiles, tortoises/turtles. Highlight that the mammal group splits into three: the placental mammals, marsupials, egg-laying mammals. Talk in more detail with your students about marsupials.

This can be done as a class activity or in small groups. If older students are working in groups independently, it can help to have biological information on the back e.g; lays soft-shelled eggs, covered in dry scales.

Southern Koala

Scientific name: *Phascolarctos cinereus victor*

Distribution: Australia, specifically in Victoria with a range extending west to the Eyre Peninsula in South Australia

Diet: *Eucalyptus* leaves

Habitat: *Eucalyptus* forests in cool temperate to tropical areas

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Koalas are marsupials, spending most of their time high up in the branches of trees where they can feed, rest and gain some protection from ground-dwelling predators such as dingos and domestic dogs. There are two types of koala – northern and southern. In the wild, the koalas range as far north as Queensland on the east coast of Australia, down through New South Wales, Victoria and South Australia. In Koala Creek, we have southern koalas. There are a few notable differences between the two types of koala.

Size: Male southern koalas measure around 78cm, whereas male northern koalas are smaller at around 70cm. They are also much heavier, weighing in at around 12kg – nearly twice that of male northern koalas which weigh closer to 6.5kg.

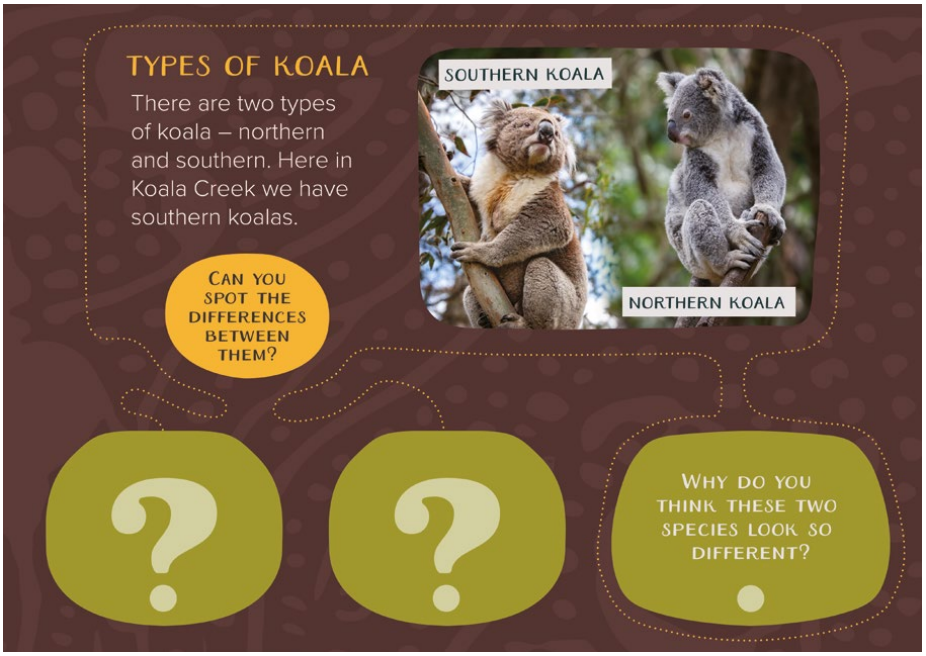
Fur: Northern koalas have darker, grey fur compared to the lighter southern koalas. Southern koalas' fur is also longer and thicker than their northern counterparts.

Animals adapt in all sorts of ways to help them survive in a particular environment. The differences seen in the southern koalas are thought to be adaptations to keep them warm during the colder winters experienced in the south of the country.

Koalas eat leaves from *Eucalyptus* trees. In fact, it's pretty much all they eat. They get almost all the water they need from the leaves too. *Eucalyptus* leaves are toxic to most other herbivores and low in nutrients. Koalas need to eat enough to get the energy they require. A fully grown koala can munch its way through 500g of leaves every single day and conserve energy by sleeping for around 20 hours a day. Even when they are awake, you could be forgiven for thinking they are asleep, as they don't move around very much. It is likely they evolved to eat *Eucalyptus*, although it is nutritionally poor, as it is constantly available (being evergreen) and because there are very few competitors for it.

Whilst at Longleat...

Students should be encouraged to observe koala features and discuss why they look like they do. Encourage them to use the interpretive graphic panels to find out more. They can see if they can spot the differences between the southern and northern koala and also take a close look at a replica koala skull. Can they see the adaptations mentioned on the real koalas e.g. double 'opposable' thumbs?



Can your students work out which koala is which? In Koala Creek there are large images of each of the koalas. Ask your students to pick a koala and then try and work out who it is?

During the talks the students will be given ID cards and asked to identify certain koalas.

In the wild, researchers have used the pattern of pink on the underside of a koala's nose to tell them apart, as this is unique to each individual.

Take some time to investigate the *Eucalyptus* on display.

Visit other animals that are arboreal (live in the trees) e.g; what do they have in common with the koala?

Ask your students to draw animal hands and feet as they go around Longleat. Can the students explain why they look the way they do, depending on how the animals need to use them; koalas grip, wombats dig, sea lions swim.

In the classroom...

Following a class discussion, ask your students to label the adaptations the koala has, related to its habitat and the food it eats, on the outline provided in this pack. Labels are also provided that can be copied or stuck onto the outline. This could be done before or after a visit.

Southern Hairy-nosed Wombat

Scientific name: *Lasiorhinus latifrons*

Distribution: From southern New South Wales to south-eastern Western Australia

Diet: Grasses

Habitat: Semi-arid areas of grassland, open plains, shrub land, savanna and open woodland

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There are three different species of wombat in Australia: the bare-nosed (or common wombat), the southern hairy-nosed and the northern hairy-nosed. Here at Longleat we have southern hairy-nosed wombats. It's quite fitting that wombats have a home here at Koala Creek because, believe it or not, a koala is a wombat's closest living relative.

Wombats are nocturnal, emerging from their burrows at night to feed. They are grazers, feeding predominantly on grasses. They have rodent-like teeth and very strong jaws that grip and tear the grasses they eat.

Wombats dig burrows with powerful front claws and, like most other marsupials, have a pouch to carry their young. Their pouch opens backwards, that way the joey doesn't get covered in dirt when the adult is digging holes. A wombat's underground burrow can be made up of several interconnecting tunnels and chambers sometimes reaching 30m in length. Their burrows are designed so perfectly that even when the air temperature above ground is unbearably hot or cold, the temperature in the burrow remains at a constant 26° C in summer and 14°C in winter.

In order to cope with the harsh, arid habitat where they live, southern hairy-nosed wombats are adept at water conservation. They're so good, that they get all the water they need from their food and do not need to drink.

One of the ways they conserve water is by excreting as little water as possible. Unusually, wombat poo is in fact cube-shaped. Research is ongoing as to exactly why this is and how they do it! One suggestion is that it is connected to the dry environment and the need to squeeze as much water out as possible. In captivity, it is less often as cube-shaped as seen in the wild, possibly because the wombats have access to a plentiful supply of water.

Recent research investigating wombat intestines found that they were more irregularly shaped compared to that of a pig and had two distinct grooves.

Whilst at Longleat...

Students should be encouraged to observe wombat features and discuss why they look like they do. Encourage them to use the interpretive graphic panels to find out more.

Visit other animals that dig e.g; aardvarks, armadillo and rabbits. What do they have in common with the wombat?

Visit other herbivores. How do they feed? How do they compare with wombats depending on what type of plant material they feed on? For example, white rhinos are also grazers and have a big wide mouth for eating grasses, a giraffe uses its long tongue to browse leaves off trees.

In the classroom...

Following a class discussion, ask your students to label the adaptations the hairy-nosed wombat has, related to its habitat and the food it eats, on the outline provided in this pack. Labels are also provided that can be copied or stuck onto the outline. This could be done before or after a visit.

Long-nosed Potoroo

Scientific name: *Potorous tridactylus*

Distribution: Patchy distribution throughout south-eastern Australia and Tasmania

Diet: Predominately fungi (specifically truffles) but also invertebrates such as insects and plant material such as roots

Habitat: Shrubland, coastal scrub, heathland, forest, woodland and rainforest

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Charles Darwin described the long-nosed potoroo as, "an animal, as big as a rabbit, but with the figure of a kangaroo." A fitting description, given this small marsupial belongs to a family often referred to as 'rat-kangaroos'. As its name suggests, this species has a long, tapering nose, perfect for sniffing out its favourite food (truffles) as it hops around the forest floor at night.

Although the long-nosed potoroo is not as well known or charismatic as a koala, it is a very important species. Within its habitat, it performs some essential roles. Firstly, when digging for fungi, they turn over the soil which aerates it and improves the soil condition. Their other role is in spreading essential fungal spores.

The importance of potoroos

On the roots of many plants live species of fungi known as mycorrhizal fungi. The plant supplies them with food and they help the plant absorb more nutrients and moisture from the soil. This is common for species of *Eucalyptus* tree.

Many of these fungi produce fruit below the ground (rather than produce mushrooms above ground).

The attractive smell from these fruit (truffles) encourages potoroos to dig them up and eat them.

The spores of the fungi survive the journey passing through the potoroos' body, and end up in their droppings.

Invertebrates such as dung beetles then bury the droppings in the soil, allowing new fungi to grow. The potoroos move around to different parts of the forest, spreading the spores as they go.

One study found that potoroos ate over 60 different species of fungi. This means that they spread common, but also rarer species, so the health of the forest and the survival other wildlife relies on them. Potoroo populations are declining in many areas and over time this will impact the whole ecosystem.

Whilst at Longleat...

Find the potoroos
It can be tricky to see the potoroos at first. They often hide away resting or sleeping in the day as they are nocturnal. A favourite place is under the foliage in the first outdoor koala area so take a look there.

In the classroom...

Introducing the long-nosed potoroo

Have your students seen or heard of a potoroo before?
Can they draw a picture of what it might look like, perhaps using Darwin's description?
If they have a photo, can they describe it for a friend to draw?

Potoroos and the forest

Can they draw a diagram/sequence events of the relationship between potoroos and fungi?
Compare with seed dispersal in plants which also rely on animals, e.g; berries. You could expand to look at other methods such as wind dispersal.


Southern
hairy-nosed wombat


Southern
koala


Long-nosed potoroo

Wombat adaptations

Koala adaptations

Adaptation Labels:

Wombat

Continuously growing teeth as they are worn down by tough grasses

Very strong jaws that allow them to grip and tear grasses

Broad paws with strong, blunt claws for digging

Backwards facing pouch so the joey doesn't get covered in dirt when the mother is digging holes

Stout legs for digging

Koala

Pad and extra thick fur on their bottoms to provide cushioning

Double 'opposable' thumbs on their front paws and a single thumb on their hind paws they use for grooming

Backbone that helps them nestle comfortably into the forks of trees

Sharp claws to aid climbing

Special back teeth that grind leaves into a fine paste

Koalas and climate change

Koalas are one of ten species identified by the International Union for Conservation of Nature (IUCN) to highlight the impacts of climate change.

> *'Koalas are experiencing malnutrition as Eucalyptus leaves decline in nutrient richness. They highlight effects of elevated CO^2 levels on plants and on the animals that rely on them for food.'*
>
> IUCN Species and climate change: More than just the Polar Bear

What is happening?

Increased atmospheric CO^2 levels reduce the quality of *Eucalyptus* leaves

Increase in frequency and intensity of droughts

Nutrient shortage for koalas

Koalas descend from trees in search of water/new habitat

Risk of bush fire

Malnutrition and starvation

Vulnerable to predators and road traffic accidents

Difficult for koalas to escape

Food supply destroyed

Why are koalas particularly at risk?

Koalas are true habitat and food specialists. They only inhabit *Eucalyptus* forests, and only eat a very small selection of the 600+ species of *Eucalyptus*.

Do koalas have any other threats?

Koalas also have the additional threats of habitat destruction and the spread of disease.

Can koalas adapt to the changes?

To adapt, koalas would need to eat more or become even more selective in the *Eucalyptus* they eat. Both of these bring additional challenges. The ability to adapt is linked to genetic variation, which, in koala populations is low. Therefore koalas have a limited capacity to adapt to rapid human induced climate change. Scientists are not confident they can adapt, so we need to act.

Is it too late?

It is not too late for the koala. The species although threatened, can be saved from extinction. The Australian Government and wildlife organisations are working towards this. **Koala LIfe** is one of these, conducting research into understanding and conserving this iconic species.

Worsening climate effects are inevitable due to greenhouse gases already emitted but strong and timely targets to reduce emissions are needed to stop this accelerating. Governments and international organisations can set these targets, but they can only be achieved by changes in our behaviour.

How can we help?

It may be that your students are very knowledgeable about climate change issues, but if not, how they learn about them is important. Often talking about conservation issues can leave children feeling powerless or frustrated. Many factors in their lives and in the world around them are not under their control. Conservation education is important but it should inspire children to learn about wildlife and the amazing planet we live on, and not focus solely on the negatives.

When discussing causes of climate change, particularly with younger children, focus on those that they can influence. Air pollution, from energy generation and emissions from different forms of transport, is a big one. Many positive actions can be taken to make a difference. A few are listed below that students can do for themselves.

Saving/not wasting energy

- ✓ Turn off lights not being used
- ✓ Turn off the TV (and other devices) rather than leaving them on standby when nobody is using them
- ✓ Unplug chargers from the socket (they still draw electricity when plugged in)
- ✓ Put on a jumper rather than asking for the heating to be turned on or up
- ✗ Don't leave the fridge door open for a long time

Cutting down vehicle emissions

- ✓ Walking, scooting or cycling on short journeys
- ✓ Walking or cycling to school
- ✓ For older students, using the bus or sharing lifts with friends rather than everyone travelling separately

There are many websites with helpful tips for doing your bit in the fight against climate change. Two particularly aimed at children are:

kidsagainstclimatechange.co

natgeokids.com/uk/discover/geography/general-geography/what-is-climate-change

You may want to consider a different set of actions that you could do at school.

In the classroom...

Ask the students to think about what uses electricity at school and at home. Do they know where the electricity comes from? Can they research renewable and non-renewable sources?

Create a pledge board; it could be with a Eucalyptus forest background. Each child has their own koala cut out that they add to the board with their pledge on, 'I am saving koalas by...'

If you want to raise funds for koala conservation you can support Koala Life.

Koala Life

Koala Life was established by the South Australian Government as an organisation to lead vital research into the understanding of koalas. Koala Life has a team of scientists and ambassadors that work together to support koala conservation. Longleat's Lord Bath, Ceawlin Thynn is one of the organisation's patrons.

As part of their role, Koala Life carry out and promote research into the biology, management and conservation of koalas enabling them to provide information and educate. They hope to provide learning and training opportunities and connect national researchers. From their work they can lead on the development and implementation of strategies for the sustainable management of koalas and their habitat.

To do their work they need to raise funds to support the research projects. As an organisation, Longleat helps to fund their work. Our koalas also act as a further research population. Our keepers keep daily records which are extremely detailed even down to recording the weight of their poo.

To find out more about Koala Life you can visit their website koalalife.asn.au

Koala Life

Planning a cross curricular project on koalas