

Dippy on Tour

A Natural History Adventure



Link4Life



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KS2

- Enquiry walk around Dippy

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This resource for visiting school groups aims to support teachers and support staff to make the most of the visitor experience to Dippy on Tour in Rochdale.

An essential factor in inspiring the next generation of future scientists is through the development of children's scientific enquiry and thinking, enabling them to make predictions and hypotheses using direct observation in and around Dippy and through the exhibition at Touchstones. Through key stage 2, children are expected to use straightforward scientific evidence to answer questions or to support their findings.

Engaging in dialogue with children through questioning and supporting independent enquiry will enable children and young people to interact with Dippy and the exhibition. This resource aims to enable teachers to develop the curriculum and pre and post visit learning opportunities to match the specific needs of their children.



Enquiry Zone 1 – What type of animal is Dippy?

KS2 Working Scientifically Links

- Asking relevant questions and using different types of scientific enquiries to answer them
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings
- Identifying scientific evidence that has been used to support or refute ideas or arguments

KS2 Science Curriculum Links

- Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- Recognise that living things can be grouped in a variety of ways
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- Describe the simple functions of the basic parts of the digestive system in humans
- Identify the different types of teeth in humans and their simple functions
- Construct and interpret a variety of food chains, identifying producers, predators and prey
- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- Give reasons for classifying plants and animals based on specific characteristics
- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock
- Recognise that living things have changed over time and that fossils provide information about living things that inhabited Earth millions of years ago
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

Key Questions

Pre-visit questions

What is a dinosaur?

What animal group did Dippy belong to?

What are the features of a sauropod?

What other types of dinosaurs roamed the earth?

What are the features of a theropod, how are they different to sauropod?

What did Dippy eat?

Did Dippy lay eggs?

Developing enquiry through direct observation during the visit?

Looking at Dippy, what can you see that tells us that Dippy was a sauropod?

How do we know Dippy was a reptile?

Key Vocabulary	
Dinosaur	<p>Dinosaurs are a group of reptiles that dominated the land for over 140 million years (more than 160 million years in some parts of the world. Many dinosaurs became extinct around 66 million years ago, but a group of living dinosaurs are still with us today : birds</p> <p>The following features can be seen in dinosaurs;</p> <ul style="list-style-type: none"> • An upright stance • The legs are perpendicular to the body, unlike lizards that walk with bent elbows • The skull has a hole between the eye socket and nostril • Dinosaurs had two holes behind the eye socket. Large, strong jaw muscles went through the holes to attach directly to the top of the skull <p>With the exception of some birds, for example penguins, dinosaurs lived on land, not in the sea.</p>
Reptile	<p>Reptiles are cold-blooded, they use the sun and the shade to regulate their temperature. They are vertebrates (an animal with a back bone or spinal column), most have four legs, they breathe through their lungs, they have scales or scutes and they lay eggs.</p>
Herbivore	<p>An animal that eats only plants.</p>
Sauropod	<p>A very large four-legged herbivorous dinosaur with a long neck and tail, small head, and massive limbs.</p>
Herd	<p>A large group of animals of the same type that live and feed together.</p>
Theropod	<p>Large theropods are carnivores that walked on two legs. Small theropods are carnivores, herbivores and omnivores that walked on two legs and often had feathers. Birds are part of this group.</p>
Dippy Facts	
<ul style="list-style-type: none"> • Dinosaurs lived more than 160 million years ago in the Mesozoic Era • Dippy is a reptile like all other dinosaurs, which meant it laid eggs • Dippy was a herbivorous dinosaur. • Dippy's skeleton measures 21.3 metres in length and is over 4 metres both width and height - weighing 20,000kg (the same as 13 cars) • Dippy's cast has 292 bones • Diplodocus lived in herds • Dippy was quite slow, walking between 5 and 9 miles an hour • Dippy lived for 70 – 80 years, similar to modern day elephants and humans • Sauropod eggs like Diplidocus were about the size of a grapefruit but some were the size of a football 	
I wonder...	
<p>I wonder why Diplodocus lived in herds?</p> <p>I wonder how Dippy is different to other dinosaurs we know?</p>	

Enquiry Zone 2 - How did Dippy survive?

KS2 Working Scientifically Links

- Asking relevant questions and using different types of scientific enquiries to answer them
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings
- Identifying scientific evidence that has been used to support or refute ideas or arguments

KS2 Science Curriculum Links

- Recognise that living things have changed over time and that fossils provide information about living things that inhabited Earth millions of years ago
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution
- Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement
- Recognise that environments can change and that this can sometimes pose dangers to living things
- Describe the simple functions of the basic parts of the digestive system in humans
- Identify the different types of teeth in humans and their simple functions
- Construct and interpret a variety of food chains, identifying producers, predators and prey
- Identify how sounds are made, associating some of them with something vibrating
- Recognise that vibrations from sounds travel through a medium to the ear
- Find patterns between the volume of a sound and the strength of the vibrations that produced it
- Describe the ways in which nutrients and water are transported within animals, including humans

Key Questions

Pre-visit

- What other types of animals lived at the same time as Dippy?
- Did Dippy have any predators?
- How much did Dippy weigh?
- Did Dippy digest food like we do?
- Did Dippy live alone?
- What was Dippy's diet?
- Did Dippy digest food like we do
- Is Dippy's skeleton similar to our skeleton? What are the similarities and differences between Dippy's skeleton and a human skeleton?
- How long would you estimate the length of Dippy's neck to be, what would be the benefits of having such a long neck?
- Most mammals (even giraffes) only have 7 bones in their neck, how many bones does Dippy's long neck have?
- How do you think such a long neck would have been supported?

During the visit

- What body parts does Dippy have?
- How big is Dippy compared to other animals?

During the visit

- Dippy's teeth are like pencils, arranged like a rake or a comb, how might this have supported Dippy feeding?
- What do you notice about Dippy's tail, how might this have helped Dippy survive?
- How do you think Dippy protected itself?
- Dippy was able to rotate its head, how do you think Dippy's skull is attached to its neck to enable this?
- What do you notice about Dippy's ribs, how would you describe them and how do you think they would have supported and protected Dippy?

Key Vocabulary

Molars	A grinding tooth at the back of a mammal's mouth.
Incisors	A narrow-edged tooth at the front of the mouth, adapted for cutting.
Canines	A pointed tooth between the incisors and premolars of a mammal, often greatly enlarged in carnivores.
Habitat	The natural environment in which an animal or plant usually lives.
Faeces	The waste passed out of the body of a human or animal through the bowels.
Gastroliths	A small stone swallowed by a bird, reptile, or fish to aid digestion in the gizzard.

Dippy Facts

Digestion

- Diplodocus faeces may have been a tonne or two of liquid, creating a pool over 10m across
- Dippy did not chew its food – it swallowed leaves and ferns whole and digested them in its stomach
- Dippy's teeth are like pencils and each tooth was replaced every 35 days. If this didn't happen, the dinosaur would eventually lose all its teeth and would be unable to eat
- Dippy had 5 toes spread out to help support its weight. The Diplodocus also had a thumb claw on each foot
- Dippy's teeth are arranged like a rake, which scientists think helped Dippy to strip leaves from trees
- Dippy has 46 teeth; humans have 32 teeth.
- Dippy had to eat all day to survive on leaves – as much as a skip full each day!
- Dippy's nostrils are on top of his head and joined together rather than at the end of its snout. The theory is that the nostrils are higher up so that Dippy could still breathe whilst having a mouth full of food

- Some scientists thought that Dippy would have swallowed stones to help digest its food. The stones are called gastroliths – these would help grind the food, as Dippy didn't have any molars - some experts dispute this

Protection

- Dippy's skull was attached to its neck with a ball-and-socket joint – similar to our hip joint. This enabled to rotate its head
- Dippy's long neck contains 15 bones – most mammals (even giraffes) only have 7 bones in their neck
- Dippy did have ears but it is unlikely that he had big outer ears like we do. Tiny, fossilised ear bones have been found in some dinosaurs that suggest that they had ear openings like birds do
- Scientists are still wondering what sound Dippy made but they think that its tail made a very loud whip crack like a cannon
- Given its size, it's extremely unlikely that a healthy, full-grown, 25-tonne Diplodocus would be targeted by predators

I wonder...

I wonder why Dippy's teeth were different to human teeth?
I wonder whether Dippy had any predators?

Enquiry Zone 3 - How do scientists learn about dinosaurs?

KS2 Working Scientifically Links

- Asking relevant questions and using different types of scientific enquiries to answer them
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings
- Identifying scientific evidence that has been used to support or refute ideas or arguments

KS2 Science Curriculum Links

- Describe in simple terms how fossils are formed when things that have lived are trapped within rock
- Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

Key Questions

Pre-visit questions

What is a fossil?

How do scientists use fossils to learn about dinosaurs?

What type of fossils have scientists found?

Key Vocabulary

Palaeontologists	A scientist that studies organisms that lived on earth before there were written records, especially by examining fossils.
Fossil	The shape of a bone, a shell, or a plant or animal that has been preserved in rock for a very long period.
Species	A set of animals or plants in which the members have similar characteristics to each other and can breed with each other to produce fertile young.

Dippy Facts

- Dippy is not a real fossil. He is a cast made from the original
- The original fossil of Dippy was found in Wyoming, America in 1898
- Dinosaur fossils have been found on every continent of Earth, including Antarctica
- Fossils help us understand what dinosaurs were like – fossilized bones, footprints, stomach stones, faeces, internal organs, soft tissue and feathers have all been found
- Some large fossilised dinosaur eggs that were discovered in China were over 60cm long and 20cm wide
- Fossils are remains of once-living plants and animals that have been preserved in rock. These are buried in soft sediment such as sand or mud, which over millions of years turn into rock

I wonder...

I wonder what scientists can learn from fossils?

Why is studying dinosaurs useful for us now?

KS2 - Science Curriculum Links Overview

Year 3 and 4: Working Scientifically

- Asking relevant questions and using different types of scientific enquiries to answer them
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings

Year 3: Animals inc. humans

- Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement

Year 3: Rocks

- Describe in simple terms how fossils are formed when things that have lived are trapped within rock

Year 4: Living things and their habitats

- Recognise that living things can be grouped in a variety of ways
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- Recognise that environments can change and that this can sometimes pose dangers to living things

Year 4: Animals inc. humans

- Describe the simple functions of the basic parts of the digestive system in humans
- Identify the different types of teeth in humans and their simple functions
- Construct and interpret a variety of food chains, identifying producers, predators and prey



Year 4: Sound

- Identify how sounds are made, associating some of them with something vibrating
- Recognise that vibrations from sounds travel through a medium to the ear
- Find patterns between the volume of a sound and the strength of the vibrations that produced it

Year 5 and 6: Working Scientifically

- Identifying scientific evidence that has been used to support or refute ideas or arguments

Year 5: Living things and their habitats

- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird

Year 6: Living things and their habitats

- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- Give reasons for classifying plants and animals based on specific characteristics

Year 6: Animals inc. humans

- Describe the ways in which nutrients and water are transported within animals, including humans

Year 6: Evolution and inheritance

- Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution
- The non-statutory guidance recommends studying at least one scientist. Mary Anning is included in the list

