

The University of Manchester
The Manchester
Museum

MANCHESTER
1824

Dinosaur Detectives



Discovery Session

dinosaurs

Dinosaur Detectives Discovery Session

Thank you for booking a Dinosaur Detectives Discovery Session at The Manchester Museum. This interactive session lasts 2 hours and is led by a Museum Scientist. Children are trained to be palaeontologists so that they can help us to solve a dinosaur murder mystery.

The session incorporates handling activities in the Discovery Centre with investigations in the Pre-historic Life gallery.

Session Aim

The overall aim of the session is to provide school groups with an opportunity to develop and apply their scientific enquiry skills in the unique setting of The Manchester Museum.

The session involves real object handling, problem solving and a creative thinking element that focuses on the popular theme of dinosaurs.



Checklist

A checklist is included at the back of this pack. It gives important details on what you will need for the visit, such as the number of helpers required. It also provides information for the Museum. Please sign and give your completed checklist to your group leader on arrival.

How to use these resources

These resources have been designed to integrate the Museum session into a larger scheme of work.

To get the most from your visit it is suggested that you read the pack before you come. It contains basic information on the structure of your visit, as well as preparatory work (pre-visit) that needs to be done before your session and follow up work (post-visit) that you may like to use.

Pre-visit work




This work should be done before your session and will help familiarise children with topics covered in the Museum.

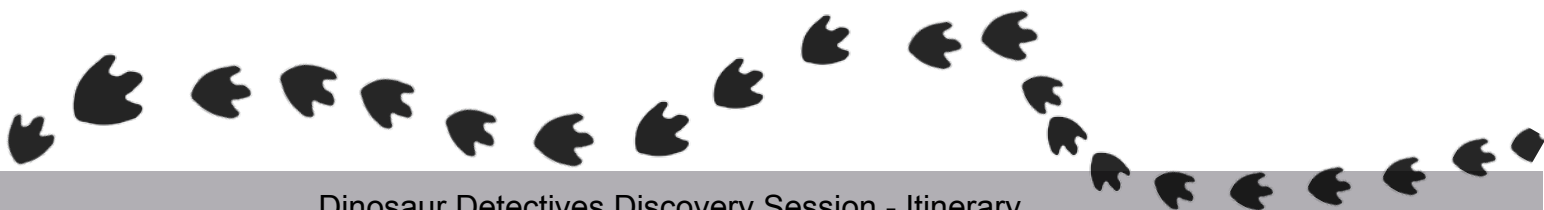
Post-visit work

Having solved the dinosaur murder mystery, the class might wish to use the stories they create during the session as the basis for a number of additional activities.

itinerary

Dinosaur Detectives Discovery Session

Section	Description	Preparation and Links
<p>1. Introducing Fossils</p> 	<p>The session begins in the Discovery Centre where pupils will briefly investigate a number of fossils from the Museum's collections. Children will work in groups to investigate and describe a variety of fossils, creating a word bank.</p>	<p>The class will need to be divided into groups of maximum six pupils (max five groups). Each group will need an adult to supervise and scribe for the group. See: Handling Sheet and What is a...</p>
<p>2. Developing palaeontological skills</p>	<p>Still in the Discovery Centre, children will learn how to ask basic questions to find out about life in the past. Children will learn how to think like a palaeontologist.</p>	<p>The class will remain in their five groups. See: What is a...</p>
<p>3. The Crime Scene</p> 	<p>Having completed the training programme, children will be asked to help solve a prehistoric murder mystery. Children will visit a "crime scene" and must work in their groups to gather the relevant evidence that they will be using to help them solve the crime.</p>	
<p>4. The Suspects</p>	<p>Back in the Discovery Centre, pupils will be introduced to the five suspects and will work in five groups to find out more about each suspect. This will involve interpreting specimens, diagrams and other information about the suspects.</p>	<p>See: Dinosaur Myths and Facts.</p>
<p>5. The Story</p> 	<p>Children will finally be asked to decide which suspect they think is guilty. Each group will be given a short amount of time to prepare and present a story that explains who did it, why and how.</p>	<p>See: Story telling sheet for a post visit activity</p>



museum objects


Dinosaur Detectives Discovery Session

During the Dinosaur Detectives session there will be handling of real museum objects. There will be an explanation of the guidelines for handling specimens from Museum staff, but it is often useful to have discussed this before your visit. You may find it useful to undertake some of the activities below in order to introduce the concept of a museum and what the children may see on their visit.

Suggested Activity

GROUPING AND MATERIALS

Aim: To encourage children to observe and describe a range of familiar natural objects. To help children understand that there are many different ways of organising, grouping and displaying these objects.

Type of Activity	Resources	Instructions
 Handling	<ol style="list-style-type: none"> 1. Range of simple, natural objects (e.g. sea shells, feathers, fossils, modern bones (cleaned chicken bone), fir cones, twigs, leaves, nuts, stones, pebbles, chalk, salt, talc, sand, clay) and one or two man-made objects (e.g. brick, wooden or clay object). 2. Blank paper and pencils or flip chart and pen. 	<ol style="list-style-type: none"> 1. Lay out all of the objects and ask the children to discuss and decide which objects are "animals" (i.e. bone, feathers, shells), "minerals" (i.e. rocks and minerals) and "vegetables" (i.e. plant material). 2. Put the objects into their groups and discuss the similarities and differences within and between the groups. 3. Explain that this is just one way of grouping natural objects. Ask the children to think of as many different ways of grouping the objects as possible e.g. size, colour, weight, age, where they come from.



Background Information

- * Museums organise their objects in many different ways. These include chronologically, geographically or even by the type of object they are.
- * The way objects are organised influences the way people look at and interpret them.
- * **Something to think about:** You may like to discuss methods of organising objects and following your visit, ask the children to decide how The Manchester Museum organises its objects.

what is a...

Dinosaur Detectives Discovery Session

Throughout the Dinosaur Detectives session a number of terms will be used. To gain the most from the session, children should be familiar with some key terms before they arrive. This worksheet gives a brief explanation of some of these terms and also some basic background information for teachers.

Useful Information

What is a palaeontologist?

A palaeontologist is a geologist who mostly studies fossils. Palaeontologists use fossils to find out what life was like millions of years ago.

A geologist studies rocks, minerals and fossils. They use all these as clues to find out what the Earth was like millions of years ago.



What is a fossil?

Fossils are the remains or evidence of animals and plants that lived more than 10,000 years ago. To become a fossil you must be buried shortly after you die before you break up or rot and decay. Soft parts such as eyes, skin and hair rarely become fossilised because they rot so easily. Hard parts such as teeth, shells and bones are more likely to become fossilised because they take longer to rot.

What is a body fossil?

Body fossils are the fossilised remains of ancient life such as bones, teeth and shells. Body fossils were once part of an animal or plant.

What is a trace fossil?

Trace fossils are the fossilised evidence left behind by animals, such as footprints, bite marks, burrows, eggs and droppings. Trace fossils were never part of the animal but were made by them.



What is a dinosaur?

Dinosaurs lived between 251 and 65 million years ago but are now extinct. Dinosaurs were reptiles that lived on land and like mammals, they walked with their legs directly beneath them.

What is a specimen?

A specimen is an example of a plant or animal that scientists study. Museums contain lots of specimens for example, there are over 4 million specimens (such as rocks, minerals and fossils) in The Manchester Museum.

facts & myths

Dinosaur Detectives Discovery Session

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Either before or after the session, you may find it helpful to have some interesting dinosaur facts to tell the children. Trying to search for factually correct information about dinosaurs is often a difficult task, and you may well find that different sources provide contradictory information. To avoid confusion, we have put together a list of our top five dinosaur facts and some of the more common myths about dinosaurs.

Top 5 Dinosaur Facts

1. The oldest dinosaur types are known from rocks in Argentina and Brazil and are about 230 million years old. The most primitive of these types, Eoraptor, was a small meat-eating dinosaur. Because Eoraptor's skeleton shows some advanced skeletal features, older dinosaurs may yet be found.
2. The largest complete dinosaur skeleton comes from Brachiosaurus which grew up to 23 m in length and 12 m in height (about the length of two large school buses and the height of a four-story building). Bits of leg and back bone belonging to dinosaurs such as Argentinasaurus and Amphicoelias suggest that some dinosaurs may have been twice the size of Brachiosaurus, but the exact size is not known because a complete skeleton has not been found.
3. The smallest dinosaurs were just slightly larger than a chicken; Compsognathus ("pretty jaw") was 1 m (3 ft) long and probably weighed about 2.5 kg (about 6.5 lb).
4. Over 950 species of dinosaur have been named
5. About 50 types of dinosaurs have now been found in the British Isles and most of these come from rocks in the South of England.

Top 5 Dinosaur Myths

1. Dinosaurs did not fly or swim; they lived on land and did not have either wings or flippers. Ichthyosaurs and plesiosaurs were not dinosaurs, they were marine reptiles. Pterosaurs were not dinosaurs, they were flying reptiles
2. Dinosaurs and humans did not live at the same time, there was a gap of around 64 million years between the extinction of dinosaurs and the emergence of humans.
3. Dinosaurs did not all live at the same time. Stegosaurus had already been extinct for around 80 million years before Tyrannosaurus rex appeared.
4. We do not know what colour dinosaurs were. Direct fossil evidence for dinosaur skin colour is yet to be found. Paleontologists think it is likely that some dinosaurs had protective colouration, such as pale undersides to reduce shadows, irregular colour patterns to make them less visible in vegetation etc. Most dinosaurs probably were as brightly coloured as modern lizards, snakes, or birds.
5. Dinosaurs do not represent failure; dinosaurs ruled the earth for longer than any other land animal (around 150 million years) and may have evolved into birds.


tracking dinosaurs

Dinosaur Detectives Discovery Session


After the session, you may wish to ask children to write a story to describe what they think happened to the T. rex victim. You may also want to extend this work using the ideas provided below.

Suggested Activities

MAKING TRACKS

Type of Activity	Resources	Instructions	Discussions
 Art	1. Photocopied maps enlarged to A3. 2. Photocopied stories (A3) 3. Footprint stamps (see below) 4. Ink pads for each pupil / group	1. Read the story to the class. 2. Hand out copies of the map and story. 3. Using the footprint stamps and inkpads, ask pupils to stamp each dinosaur's movements on the map to make a visual record of the story.	Some questions to think about: Q: How can you tell if a dinosaur walked on two legs or four legs? A: Two legs = footprints all the same shape / Four legs = two shapes of footprint Q: Which dinosaurs were carnivores and which were herbivores? How do we know? A: Carnivorous dinosaurs only walked on two legs, so all four-legged dinosaurs were herbivores. We know that Terry, Agnes and Angie were carnivores because they were hunting other dinosaurs for food. Trish, Brenda and Pete were all herbivores because they walked on four legs.

MAKING STORIES









Type of Activity	Resources	Instructions	Discussions
 Word play	1. Photocopied maps enlarged to A3. 2. Footprint stamps (see below) 3. Ink pads for each pupil / group	1. Ask pupils to stamp out some tracks on the map that tell their own story. 2. Using the landmarks on their maps as a reference, pupils can write up their own stories to explain the tracks.	Some questions to think about: Q: Is this an exact science? Do all interpretations reach the same conclusions? Can evidence be read in different ways? Why? A: Pupils should find that their original stories are different to those of their classmates, despite being based on the same evidence. People interpret tracks in different ways because, rather than being an exact science, understanding footprints requires some guesswork! Q: Do we know for sure that the tracks tell a certain story? A: After writing their stories, ask pupils to let a fellow pupil write a story to explain their tracks. You should find that the similarities will be based on the factual evidence (such as direction and landmarks). Differences highlight areas where evidence is missing (e.g. speed of locomotion).

storytime.....

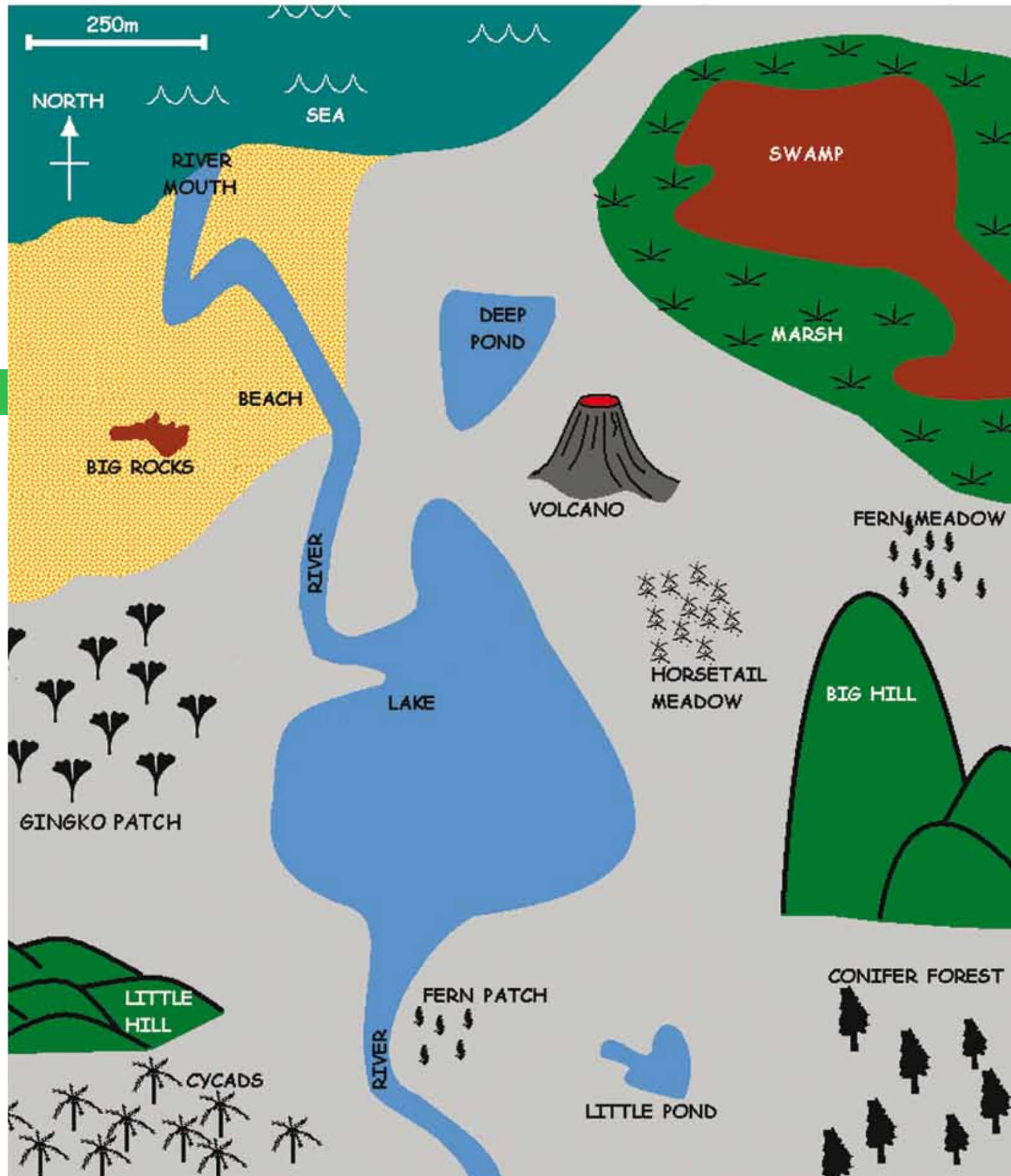
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The following story is about 6 dinosaur characters on a journey through the Cretaceous landscape. Activities related to this story involve plotting the routes taken by each character on a map (below) showing the main features of the landscape. The box below details information on the dinosaurs, including their footprint shapes. Sections of the map are used to illustrate the journey throughout the story. Instructions on making the stamps for further activities are included at the end of the pack.

Dinosaur Factfile

Dino Name	Tyrannosaurus	Triceratops	Ankylosaurus	Albertosaurus
Character Name	Terry	Trish	Brenda & Pete	Angie & Agnes
Pronunciation	Tie-ran-oh-saw-rus	Try-serra-tops	Ank-eye-low-saw-rus	Albert-oh-saw-rus
Vital Statistics	 Length: 12m Time: 68 - 65 millions years ago (mya)	 Length: 9m Time: 67 - 65 mya	 Length: 7.5m Time: 71 - 65 mya	 Length: 8.5m Time: 73 - 65 mya
Footprint shape				
Footprint Statistics	Footprint length is approximately 50cm.	Footprint length is approximately 30cm.	Footprint length is approximately 30cm.	Footprint length is approximately 40cm.

Large map



Dinosaur Story...

Story: In the tracks of Terry the Tyrannosaurus

It was a hot, sunny day. Terry the Tyrannosaurus loved the sun, but for some reason, it seemed to make him even hungrier. Making his way west from the conifer forest towards the river, Terry's stomach growled. The rumbling grumbling belly growl was so loud that it woke up Trish the Triceratops, who had been perfectly happy sleeping amongst the cycads before being so rudely awakened.



"What was that?" muttered Trish "It must be that volcano again," she thought.

"Now that I'm awake I may as well wander down to the swamp and have a wallow in the cool water"

So Trish set off, slowly plodding north along the riverbank towards the lake, totally unaware of Terry who was lurking between the ferns on the edge of little pond.



By now Terry was extremely hungry, and decided to spring a surprise attack on the unfortunate Triceratops and eat Trish for dinner. Terry remembered that Trish liked to sit in the swamp when it was warm, so decided to walk anticlockwise around the lake, past the horsetail meadow, and then jump out on Trish by the deep pond as she made her way to the swamp.

"Mmm, food" thought Terry.

Passing the volcano, Terry's dinner came back into sight, but unable to control his excitement, Terry's stomach once again made the hugest rumble. Trish had nearly reached the edge of the beach when she was startled by the loud rumbling noise.

"It sounds like that volcano might erupt again", she thought to herself.

Trish was just about to carry on walking when, to her horror she spotted Terry.



"Aaaah!" yelled Trish before leaping across the river and making a dash around the northern edge of the deep pond towards the swamp. Luckily for the Triceratops, Terry had been just as surprised by the noise, and was so distracted that he didn't even notice that his dinner had escaped!

So loud was the rumble, that it even startled Angie the Albertosaurus, who was known to have bad hearing. Angie had been basking in the sun with her sister Agnes, on the eastern slopes of the little hill.

Guessing that the rumble had come from the volcano, the two Albertosaurs decided to investigate and wandered up past the Gingko patch and east across the river towards the volcano.

Arriving at the volcano, Angie and Agnes were surprised to bump into their friend Terry, so asked what he was doing.



Dinosaur Story cont ...

"Hello. I'm just trying to find some dinner, I'm ever so hungry" moaned Terry.

"We just heard the volcano again, so we decided to come and check it out," said Agnes.

"Oh, um, no. Well, um. No. That was my stomach making the noise," explained Terry, very embarrassed.

"Oh, wow! You must be hungry!" laughed Agnes, who suddenly had a brilliant idea:
"Let's go to the swamp where all the herbivores go to cool down. Then we can all have some dinner!"

So the three dinosaurs ran off north, past the **deep pond** and towards the **swamp** where Trish was happily wallowing. With their dinner in sight, the terrible trio entered the **marsh**.

"Aaah, I'm sinking," cried Agnes, as they waded into the muddy water "We're going to have to turn back before we get stuck and sink. If we sink then we'll never get any dinner!"

Agnes had made a very good point, and Angie and Terry had not even noticed that they were sinking!

"Why don't we go west towards the river mouth, I've been told that those two Ankylosaurs, Brenda and Pete often spend time on the beach; fancy a bit of meaty Ankylosaurus for tea?" suggested Angie.

"That seems like a good idea," said Terry as he slowly dragged himself out of the mud.



So the three muddy dinosaurs plodded along, passing the northern edge of the **deep pond** to arrive on the **beach**. Terry was most disappointed to find that Brenda and Pete were nowhere to be seen.

"Oh no! Where are they?" wailed Terry "I'm so hungry!"

"Why don't we follow their footprints? Look, you can see them over there on the other side of the river by the Big Rocks. It looks like they headed off along the coast," said Angie, setting off west.

"Hmmm" thought Terry, who was starting to think that he might have been better off without his two companions. "I know that Angie and Agnes are my friends, but I'm ever so hungry. Agnes is a bit meatier than Angie and I think she would make a better meal. Mmmm. I'm sure Angie wouldn't mind..."

Unaware of Terry's plan and excited by the thought of some dinner, Angie had run off ahead of the other two, heading west and wading across the river to pick up the trail of the two Ankylosaurs. By the time she reached the **big rocks**, Angie noticed that she was alone. Looking back to see what was going on, she noticed that Terry was still back by the river mouth, and Agnes was nowhere to be seen.

"Where did Agnes go?" enquired Angie

"I don't know," replied Terry sheepishly, licking his lips "I don't feel quite so hungry any more, I think I might head back home".



footprint stamps

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A step-by-step guide to making your own footprint stamps.

1.



Photocopy the footprint shapes from the dinosaur factfile. Cut footprints out and lay them on a piece of foam.

2.



Draw around the footprint shapes onto the foam and cut them out with scissors or a craft knife.

3.



Glue footprints, in a stepping position (as illustrated in dinosaur factfile), to a small wooden block.

4.



Use an ink pad with the stamps...

....and get stamping!



checklist

Dinosaur Detectives Discovery Session

This is a checklist for the Dinosaur Detectives Session at The Manchester Museum. Please check that you have got or completed everything on the list below.

Please sign and hand this form over to your group leader on arrival.

You will need:

1. To have divided children into groups of six pupils (maximum of five groups)
2. Minimum of one helper per group of six (i.e. five helpers for a class of 30). During the session children will work in smaller groups. Please note that the adults should be prepared to actively engage with the sub-group during the session.
3. If your visit includes general time in the Museum before or after the session, we recommend that you visit the prehistoric life gallery as there is a limited amount of time in the gallery during the session.
4. You may wish to bring a digital camera with you to record your day.
5. Payment cheque made payable to The University of Manchester.

Please fill in:

Class size: _____

Number of helpers: _____

Name:

Signed:

Date:

Please arrive promptly for your session. If you are unavoidably delayed, please inform us by ringing 0161 275 2630.