



Formative Evaluation  
Dinosaur and Diets exhibition

Kate Pontin  
Helen O'Riain

*'I like investigation' - Girl (9)*

November 2005

### **Summary of key findings**

The design is clear and logical although the white text on orange background may present a problem to those who are partially sighted.

The text is generally understandable although there are a number of areas, including particular words and pictures, where changes may need to be made. These are highlighted in 3.3 where each individual panel is discussed.

The context provided key ideas to help children approach the activities in the intended way – in a spirit of investigation.

The children are clear about what they have to do at the interactive panels

The activities encouraged children to focus on specific aspects of the Velociraptor eg they particularly noticed the claws when focussing on the model

Afterwards children are able to explain what they have learnt.

Those who were not provided with a context did understand the basic idea that scientists use fossils and bones to find out about dinosaurs when asked about their knowledge base before doing the exhibit prototype.

Individual panels do work as isolated learning stations.

## **1.0 Introduction**

This report will briefly provide background for the research and then focus on communicating the results so that design development can continue as soon as possible.

### **1.1 Aims**

As defined by Natural History Museum staff the aims were to see if specific components work :

- The introductory panel to the dig
- The interactive label of the animatronics dinosaur
- An exhibit prototype
- Whether children get the thread/narrative of the exhibition and whether tools can be gained in the introduction to help
- Whether they would like a reward of some type

## **2.0 Methodology**

An interactive exhibit prototype was provided by the design team which included:

- Velociraptor animatronics dinosaur which unfortunately did not actually work during the evaluation
- 5 hands-on activities to accompany it
- Context details of the exhibition which included visuals and some text

The evaluation consisted of:

- One day of testing families using the contextual information ( Helen O’Riain). This included a number of visuals provided by the designers (exhibition plan, dinosaur head, becoming a dinosaur detective), related labels and information on the exhibition given as part of a verbal introduction given by the evaluator
- One day testing families without the contextual information (Kate Pontin)
- One day with school children testing the hands-on activity and also finding out about knowledge base within this context (Kate Pontin)

Families were selected randomly from the various areas near the courtyard room where we were based.

The sample included

- Children aged from 4 to 12
- A mixture of racial and cultural groups

Data gathered by each researcher provided similar findings thus validating these results.

## **3.0 Results**

### **3.1 Design**

- Children were interested in the exhibit and keen to try it out.
- It is not clear how distracting the animatronics dinosaur will be when it is working. Children may or may not be attracted to the interactive exhibits linked to it.
- White on Orange background will be an issue for those who are partially sighted
- The design was generally clear and children know what to do at each activity.
- Parents felt they would be able to support their children's learning using this text

### **3.2 Contextual information**

A number of families were provided with contextual information for the exhibition as part of their visit to the prototypes. Visuals were used in conjunction with the agree text (appendix 5) and labels

Some had the dinosaur visible while doing the activities and some had it hidden. The different set-ups did not appear to result in major differences in responses to the specific activities, apart from one 8 yr old boy who was a reluctant reader and wanted/needed to compare images with the real thing. However, my overall impression was that the learning was richer with the dinosaur to refer to while doing the activities

#### Plan of the exhibition and the dinosaur heads

This resulted in more than just polite interest by the families. Although there was not a lot of detailed feedback, the sparks of interest were definitely there and there was a lot of smiling and nodding with approval and interested eye contact. Children liked the idea of being involved in exploration of dinosaurs through interactives and investigation.

- Boy (9) liked the ideas of: 1. interacting with how dinosaurs eat 2. Digging 3. Putting fossils together. 'Yes I want to be a fossil detective'.
- Girl (6) thought it was interesting 'the way the children get to look at all the moving stuff...And you get to touch the poo! I like the dig as well – those are my three best things.'
- 'Investigation is good'. 'And putting things together'. 'The best thing would be finding out about them feeding and seeing them eating.' Boys (11 & 12)

## Become a Dinosaur Detective

### *Text – Level 1*

- The word 'Prehistoric' was not clear to 4 children
- Younger children found the label difficult to read

- The 5½ yr old read this text with difficulty – it was clear that she would not have chosen to do so if left to her own devices.
- The 6 year old read the text but it was an effort and she would not have chosen to read it if she had been in the exhibition – her mother would probably have read it for her.
- The 9 year old boy could read it easily and paraphrase it for me.
- The 8 yr old boy had some difficulty with this (eg uncovered) as not a fluent reader.
- 8 yr old girl thought it was clear apart from Prehistoric

### *Text - Level 2*

- The word 'Palaeontologists' was not clear to any of the children, although one knew what it meant when his father read it aloud. A 13 year old guessed accurately what it meant from the context, but otherwise it was a stumbling block. One 10 yr old would like to be able to find the meaning close by (*Under a flap?*).
- Children generally understood the detective approach, especially the 8+ children. A girl (9) understood clearly and knew that she would be going on to investigate things once past the panel.

### On the Plan - 'The Dig' + 'The Lab'

- Not all children knew what a Dig was.
- Children liked the idea of the dig and then finding out more at the Lab.

### Transference from activity to Velociraptor dinosaur

- This approach helped some children have a clearer understanding of the dinosaur

A Boy (9) understand about the claws and about being like a wolf as a result .

The activities helped the Girl (6) focus on the claws

Boy, (13) 'Eyes look straight forward'

Girl (8) 'It has razor sharp teeth' + 'It behaves like a wolf'

Boy (13) 'It eats meat and small dinosaurs'

*Boys (11 & 12) these two retained lots of the information, vying with each other a little to think of things – 'Fast.. to catch food... carnivore.. climbs... where it was found.. Mongolia (with help from Dad).. How long ago... 84 million years... dangerous...big claws... look very sharp.. good for holding prey down.*

### Reward wishes

- Downloadable certificate with dinosaur pictures on, would be good [x 5]

Key ring or booklet with information in *Boys (11 & 12)* Or if a downloadable certificate, then with a list of the names of the dinosaurs seen in the exhibition on it.

Would like a downloadable certificate 'with pictures of dinosaurs' on 'and a dinosaur picture to colour in' (Girl, 6)

Would like to download cert, as above, and also have a drawing on the website (but to do the drawing at home!) *Girl (5½)*

*Girl (9) Download would be ok but would have to do it at school or library as **not online at home**. Father preferred a certificate on the spot for this reason.*

### 3.3 Interactive panels

Generally children of 8 and over can read the labels for themselves easily enough to be likely to read them *in situ*.

#### Interactive Panel One: Introduction

- Some children struggle with Velociraptor as a word. Many found the phonetic spelling helpful
- All the children had problems with agile – both reading it and understanding what it means. It is recommended that this word should not be used.
- Some children found the concept of forward facing difficult until they looked at the picture and thought about it.
- There seems to be no incentive to pull the plastic sheet across – what are they discovering?
- Why is it the skeleton that is pulled out? Some children thought it might be better to start with the picture of the fossil and then discover what it would look like. Many children also had problems with the two pictures not fitting properly.
- The icons were often ignored if children were left to their own devices. When questioned most worked out that it was a world but some were totally unclear what it was. The time element graphic is not very clear but children knew that the numbers given were in relation to the age of Velociraptor. Some children had problems with carnivore and what it meant. It might be useful to put meat eater first. The symbol did not get commented on.
- Razor should be spelt with an "o" not an "e"

Girl (9)

She was not able to read Velociraptor and had problems with the icons although she did know it was a map

Seven year old didn't understand agile and found the icons hard. Didn't know what a carnivore was

Six year old read it all but concentrated so hard didn't know what she had learnt

One father spent time with a younger child looking at the introduction, finding parts of the Velociraptor and reading out the names, showing clearly that there are opportunities for younger children too

### **Interactive Panel Two: What did Velociraptor eat? The Turn and Learn**

- The pictures were indistinct and frustrated some children. They did not know what the spine and ribs picture was there for [and nor did I KP]
- Many children did not know what the steaks were in the picture. Would a more familiar meat be more understandable? Many also did not really know what that number of steaks would actually look like in real life. (eg one family was vegetarian.)

Seven year old needed help to understand what 10 steaks would look like.

Six year old didn't know what a steak was

### **Interactive Panel Three: Wolves**

- A good question but it needs a clear short answer before the additional information
- Some younger children have problems with prey and pack but a clearer photograph will help illustrate these
- As with all these panels there are issues about how far people are able to pull the "pull-outs" out without bumping into themselves or others
- "Closely related neighbours" was not understood by all children.

Girl (9) was not sure what "prey" meant

Seven year old wasn't sure what 'closely related to' meant

Six year old wasn't sure about pack or prey.

#### **Interactive Panel four: Toe Nail**

- It needs to be much clearer that this is a question as they tend to pull without thinking
- The answer is lovely and clear – a useful approach?
- It is also good to have further information below for those that want it. However here the children understand the concept of sharp points gripping but they do not know what a crampon is. A better picture showing an actual climber on ice might be helpful.

Girl (9) was not sure what crampon meant but she understood the picture.

Wanted clearer photos as wasn't sure what crampons were (7 year old girl)

Wanted to pull before read label (six year old)

Football boots would be better (a parent)

#### **Interactive Panel five: Moving Claw**

- Is this a different claw from above or the same one?
- The information from each of these last two panels influence how the children approach the following one whichever way round they are presented.
- Some children held the claw to move it – rather than the lever. One parent said you could feel that the claw could only grip and tear when you did it like this.

Seven year old needed help with making the link when doing this activity as she had not read the label.

7 year old needed parental help

### **3.4 Learning and prior knowledge**

Children from the School groups were asked about what they know about Velociraptor before starting the evaluation of the prototypes, but using the Velociraptor as a stimulus. The children had quite a good general knowledge of dinosaurs including the fact that we did not live then. They had a number of misconceptions which may or may not be altered by this exhibition as they are deeply rooted, but they were interested in finding out more and were indeed interested in knowing more about Velociraptor including the fur and feathers [“what is the fur for?” and “Why has it got fur?”]

Comments from school children using previous knowledge

It has sharp teeth

It eats meat

It eats plants

Dinosaurs have scales

The claws rip the flesh

This is a baby one

A dig to find fossils

Scientists know about dinosaurs from "old bones", "called fossils" "because they found a fossil"

Children were less confident about how we know about dinosaurs. However they were able to say that scientists used bones or fossils to find out about dinosaurs

Children were able to tell us about what they had just found out about Velociraptor including what it ate and how it might have done this

... because they found the bones

I learnt that a Velociraptor climbs up his prey

It is trying to tell you how they eat and they are showing how they eat and catch their prey. They show us that they can eat anything at all including bigger dinosaurs

Velociraptors' toes are like crampons

**Appendices**  
**Appendix 1**

Checklist/data collection  
Natural History Museum  
Formative evaluation  
Weekend 12-14<sup>th</sup> Nov, 2005-11-08

Using observations and questions accordingly

	Younger than 8	8 and over	Other family contribution
Was background given to group?			
At activity:			
1 Panel One			
2 Panel Two			
3 Panel Three			
4 Panel Four			
5 Panel Five			

In the real exhibition would they like a reward for completing the exhibition trail eg certificate, their drawing on the web etc			
Learning			

Appendix 2  
Natural History Museum – Dino Diets Formative Evaluation  
Saturday 12/11/05

**Eight families were interviewed.**

*About one in every four families asked was willing to participate. These were families with one or two children only, where the parents were not trying to juggle the needs of a larger group. (We can't because the little one is hungry; we won't have time to get to the fireworks; x is impatient to do y; can we let you know in 10 minutes) and some were foreign visitors and lacked the language skills.*

The families were white or Asian. (African Caribbean missing). I have put 'parents' instead of 'Adult family members' – although eg one boy came with aunt and uncle)

Ages of children ranged from 5½ - 13 years old as follows:

1. Parents with boy - 9
2. Mother with girl - 6
3. Parent with boy - 10
4. Parents with boy - 8
5. Mother with boy - 13  
and girl - 8
6. Mother with girl - 5½
7. Father with girl - 9
8. Parents with two boys - 11 and 12

Some had the dinosaur visible while doing the activities and some had it hidden. The different set-ups did not appear to result in major differences in responses to the specific activities, apart from one 8 yr old boy who was a reluctant reader and wanted/needed to compare images with the real thing. However, my overall impression was that the learning was richer with the dinosaur to refer to while doing the activities.

*The children were encouraged to give feedback, and parents stayed in the background for the most part. In an exhibition some parents would have mediated between child and activity, which could be taken into account. However, the child/adult ratio with school groups or even larger families is such that it seemed useful to let the children respond unaided.*

**Background information:** All families looked at the information, (but shortened explanation for the mother with the 5½ year old.)

**Plan of the exhibition and the dinosaur heads**

this was followed with more than just polite interest by the families. Although there was not a lot of detailed feedback, the sparks of interest were definitely there and there was a lot of smiling and nodding with approval and interested eye contact.

Boy (9) liked the ideas of: 1. interacting with how dinosaurs eat 2. Digging 3. Putting fossils together. 'Yes I want to be a fossil detective'.

Girl (6) thought it was interesting 'the way the children get to look at all the moving stuff...And you get to touch the poo! I like the dig as well – those are my three best things.'

'Investigation is good'. 'And putting things together'. 'The best thing would be finding out about them feeding and seeing them eating.' Boys (11 & 12)

## Become a Dinosaur Detective

### Text – Level 1

The word 'Prehistoric' was not clear to 4 children

The 5½ yr old read this text with difficulty – it was clear that she would not have chosen to do so if left to her own devices.

The 6 year old read the text but it was an effort and she would not have chosen to read it if she had been in the exhibition – her mother would probably have read it for her.

The 9 year old boy could read it easily and paraphrase it for me.

The 8 yr old boy had some difficulty with this (eg uncovered) as not a fluent reader.

8 yr old girl thought it was clear apart from Prehistoric.

### Text - Level 2

The word 'Palaeontologists' was not clear to any of the children, although one knew what it meant when his father read it aloud.

The 13 year old guessed accurately what it meant from the context, but otherwise it was a stumbling block.

The 10 yr old would like to be able to find the meaning close by (*Under a flap?*)

8 yr old girl thought it was clear apart from Palaeontologists.

The 6 yr old + 5½ yr old + 8 yr old boy would not have read this text in an exhibition

Girl (9) understood clearly and knew that she would be going on to investigate things once past the panel.

### On the Plan - 'The Dig' + 'The Lab'

Not all children knew what a Dig was.

The 10 yr old boy was not clear about it, although he knew 'Lab'. He liked the idea of the dig and then finding out more at the Lab.

### Interactives:

Boy (9) worked through the interactives without difficulty and said it was all clear and easy to understand (Even when given an 'It's ok to be critical' prompt)

#### 1. Velociraptor

- 'Razor' – (mis-spelt as razer – only one parent commented on this)
- The word 'agile' was not understood by the 3 children I asked (older children)
- The phonetic spelling of V worked for 9 out of 10 children. (Eighth one avoided it)
- There was lots of hesitation about the skeleton, playing with the acetate to try to make it match the image underneath x 4
  - e.g. Girl (6) Why does it (the skeleton) have its mouth open? It doesn't fit.
- 8 yr old boy made no links between photos and the V – despite the lines.
- Boy, (13) followed the lines and could see the sharp teeth, forward facing eyes etc.

**The three circles of info** – were largely ignored by the children. When asked, 4 made no sense of them (eg Girl (9) had no idea what they meant, despite being a good reader)

3 understood them (Easily decoded by the 13 yr old, who said that he would only bother to decode them if there were a reason such as a quiz, and by the 12 yr old).

#### 2. What's for Dinner?

Girl (6) thought both pictures weren't very clear, but was fine with the texts

Boy 10 twiddled the circle a couple of times without reading it. Wondered if the B & W photo was the spine of a Velociraptor.

Boy (8) did not link the question with the answer, but avoids text as much as possible  
Girl (5½) thought the steak was blood.  
Girl (9) thought the skeleton photo wasn't very clear  
Parent thought the steak looked like a pile of tongues.  
Boys (11 & 12) - *(Re B & W photo)* 'A bone? Another dinosaur?'

### 3. Wolves

Girl (6) thought this photo wasn't very clear either.  
Boy (10) got this easily.  
Boy (8) wouldn't have read it in an exhibition  
Girl (8) easily understood about the groups for hunting  
Girl (5½) thought the photo was of V s  
Boys (11 & 12) 'Not very clear which are the wolves'

### 4. Front Claw

Girl (6) thought this was good, but didn't know word 'crampon'  
Boy (10) did not know 'crampon'  
Boy (13) guessed 'crampon' from picture  
Girl (5½) thought the claw was the wrong colour, compared to the model. (yellow not grey)  
Girl (9) Crampon? *(Looking at the photo)* 'Why is there a skate?'  
Boys (11 & 12) Crampons? Replica?

### 5. Killer or Climber *(Note that 4 and 5 'gave the game away' about each other, whichever way round they were)*

Girl (6) grasped that the claw was not sharp enough, but no more than that.  
Girl (8) said very firmly – 'Both!'  
Boy 10 liked the claw and learned about it not ripping flesh.  
Girl (5½) Learning uncertain here. *Slight tendency becoming apparent that the dramatic words 'slash through flesh' can overwhelm the intended, more low key, message.*  
Girl (9) understood the message but thought the 'paw' holding the claw should look more like a paw.  
Boys (11 & 12) 'Good picture! It holds on to its prey'

### The Dinosaur

3 children thought it was good although not quite as good as the T-Rex.

Other responses -

**(Boy, 9)** 'I thought they weren't furry. I didn't know they could climb. I didn't know they had feathers – and it has scales too! The front claws... they seem very close to the ground' *[It seems he was looking at the front limb as if it were a normal leg and thinking the claws would be awkward to walk on]*

Girl (6) 'More fur than the others... Fur, that's a surprise... The claws are sharper than one I saw in the other room'

Surprised at the Fur/ hairy 6

Feathers 7 (Could be a bird? Girl (9))

Scales 2

Comment on combination of the three (fur feathers scales) - 3

Claws 3 (Quite sharp and big!)

Size x 3 (Small!)

Long tail x 2

Tail not pointy x 1

Tiny teeth x 1

'Markings on the back' (Parent x 1) 'Top looks like a tiger' Boys (11 & 12)

'Face and feet look different' (*from the rest of the animal*) Boys (11 & 12)  
Parent – 'Once you see claw and tooth together it's more obvious which is which'.

**Boy 8** (*With reading difficulties*) 'I don't get the face. It's got, like, woolly socks. The claws are...' *mimed curling under*. He got the wolf picture to compare, but said he thought the V looked a bit like a lion because of the mane/colouring. (*Suggested by the lion photo?*)

His parent – 'It's got feathers on its legs!'

Boy wanted to know what was underneath the V and how the animatronics worked.

### **Transference from activity to dinosaur**

It helped the Boy (9) understand about the claws and about being like a wolf.

The activities helped the Girl (6) focus on the claws

Boy, 10 – 'The claws go into flesh' – despite having understood activity 5. (*It's a more exciting idea?*)

Remember what it eats x 2 (eg Girl (5½) could remember what the V ate)

Boy, (13) 'Eyes look straight forward'

Girl (8) 'It has razor sharp teeth' + 'It behaves like a wolf'

Boy (13) 'It eats meat and small dinosaurs'

Girl (9) 'Dangerously sharp teeth' + *10 steaks a day* + 'claws grip but don't rip – but they do look sharp!'

Boys (11 & 12) *these two retained lots of the information, vying with each other a little to think of things* – 'Fast.. to catch food... carnivore.. climbs... where it was found.. Mongolia (*with help from Dad*).. How long ago... 84 million years... dangerous...big claws... look very sharp.. good for holding prey down.

### **Reward wishes**

Downloadable certificate with dinosaur pictures on would be good x 5

(if we can't have remote controlled dinosaurs or chocolate dinosaurs – Boy, 10)

Key ring or booklet with information in *Boys (11 & 12)* Or if a downloadable certificate, then with a list of the names of the dinosaurs seen in the exhibition on it.

Would like a downloadable certificate 'with pictures of dinosaurs' on 'and a dinosaur picture to colour in' (Girl, 6)

Would like to download cert, as above, and also have a drawing on the website (but to do the drawing at home!) *Girl (5½)*

*Girl (9)* **Download would be ok but would have to do it at school or library as *not online at home***. *Father preferred a certificate on the spot for this reason.*

### **Overall :**

Parental responses:

One mother said she would be interested in exploring the exhibition for herself too.

One mother said she thought it was an excellent idea and that her daughter (6) loved dinosaurs and investigating things, and had been measuring things in 'Investigate'.

All families would definitely be interested in visiting the exhibition. Girl (6) and mother wanted to bring brother and father to see it.

Five families asked when the exhibition would be on.

Parents with 9 year old – 'All good ideas!'

Parent with 10 yr old 'Interesting to do more than just look at dinosaurs'.

The exhibition shows 'the dinosaurs as they were living instead of a collection of bones – Good.' (Parent of 13 & 8 yr old)

Parents of 8 yr old were interested in the Dig and Lab as an alternative way of finding out about dinosaurs.

Why not have half a dinosaur and see the food going through it? (Parent)

**'Call it Velossy for short?'** Girl aged 6. (*My spelling*)

HO

12/11/05

### Appendix 3

#### **Sunday Families:**

Family 1 –Dad with a child of 4 years old. He read the words on the introduction panel and they looked for the different parts Other children in family group – boy of 6 who when asked how we know about all this said “because it says” and then “they live like wolves” “because they test the claw to see how sharp it is”. Parent said he would help both of them in the gallery. Keen that school should come. Thought that if a bigger dinosaur was on view the exhibits would need to be at the end.

#### Family Two

Aged 6. When asked what he had learnt said “about Velociraptor” “about hunting together” “about meat” and “about claws clinging”. Read labels well. Didn’t understand necessary

#### Family Three

Boy 9. know a lot about dinosaurs

#### Family 4

Girl 6 and boy 4

One parent, who gave a little help but did not take over.

#### Family 5

Boy aged 8 with parent and two older children.

#### Family 6

Girl 7 with Dad

#### Family 8

Girl 6 with parents

Concentrated on reading so did not always consider what it was all about - two longer labels in particular

#### Family 9

6 year old girl with a little brother and parents

girl knew what the icons meant

#### Family 10

Family of 4 children and parents. I asked 7 year old chiefly but 2 older children explored on their own and reported back. They had no problems with text. 7 year old grasped basics with some help from parent

#### Family 11

Lithuanian girl and father. He was very helpful and had ideas about claw as a handle. Translated the text for the girl. Didn’t know to pull plastic sheet out

#### Family 12

9 year old girl – shy with father

**Appendix 4**  
**Schools involved:**

St Thomas Catholic Primary School ages 9/10  
St Josephs RCP School ages 7/8

**Appendix 5**  
**Dino Diets Formative Evaluation (12-14/11/05) Version 4 10/11/05**

*Aim: Provide evaluator with text to go along with illustrations aiming at reconstituting the exhibition's overall experience for interviewees to be able to make links between individual evaluated chunks (intro panel to Dig an Lab section and Velociraptor animatronic, text and interactive).*

**1. We need your help to test a new exhibition on dinosaurs and what they eat. We would like you to try out an activity but first I can show you some pictures of what other parts might look like**

**2. The first area will have the moving heads of three very different dinosaurs, as you can see on these sketches of a dinosaur which ate meat.**

*[Show Evaluation.2 and Evaluation.3]*

**3. You can see that dinosaurs, like ourselves, needed to eat in order to survive (live). You can see that some of them eat only plants, that others eat meat and that a few eat both. (You can look at the dinosaurs' teeth and see that they use it to eat their food like we do with knives for example). You can see that different kinds of dinosaurs have different kinds of teeth according to what they eat.**

**But how do we know all this?**

*[Show Evaluation.4 and read intro text to Dig&Lab area]*

**4. In this area, you are able to look for dinosaur fossils yourselves by taking part in a dig. (You can then put together fossil bits to reconstitute bones).**

*[Show Evaluation.5]*

**5. You can compare what you have found with other pieces. You can find out how scientists learn more about dinosaurs using lots of clues (and that you have to be very patient to find all these clues)!**

**6. Once you've done enough detective work, you can imagine what it was like when dinosaurs were still alive ( – this is what you see in the next area.) You can look at different moving dinosaurs eating their food. You see a dinosaur very good at fishing, and another one which has a beak to nip leaves. (You can even touch dinosaur poo and see what's inside. You can look at a dinosaur which had a heavy armour to protect itself). And then, you come to the dinosaur that is right here today, exactly the same, except that it will be able to move.**

**7. Please come closer and have a look.**

*[Velociraptor animatronic, text and interactive – see Evaluation.6{A;B;C;D} and Evaluation.7]*