

Education Pack

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Erth's Prehistoric Aquarium

Deep below the surface, submerged below time, swam some of the world's most amazing prehistoric marine reptiles. What does a Plesiosaurs skin feel like? How big are a Kronosaurus teeth? And do Kimberella even wear shoes?

The team at Erth have spent years scouring the seven seas, collecting playful prehistoric creatures of the deep in their giant aquarium. Connecting young audiences to the real science of palaeontology Erth's Prehistoric Aquarium invites children to step into the action. Each show performers will invite a small number of carefully selected young divers to join them on their quest to the bottom of the ocean, to 'swim' with an amazing array of aquatic creatures from bygone eras who are unmistakably 'alive' and mostly friendly!

Come dive with us to the historical depths of the ocean and unlock some of nature's greatest mysteries.

Meet the Stars of the Show

After waiting 65 million years, you will now have a chance to experience prehistoric marine life up close when Erth's Prehistoric Aquarium travels around Australia.

This unique show allows heaps of interaction whilst you travel with the Erth performers on a journey through prehistoric oceans.

You will see an amazing selection of marine creatures that inhabited oceans, lakes and rivers millions of years ago.

The reptiles, fish and and other creatures on display once filled the oceans millions of years ago. Fossils of many of them have been found in Australia, from tiny single celled organisms to the apex predator – Kronosaurus Queenslandicus.

Over the next few pages is a quick preview of some of the prehistoric marvels you are likely to encounter.

Paracyclotosaurus

Paracyclotosaurus davidi is the only species of Paracyclotosaurus to be found in Australia.

In 1910 a complete skeleton fossil was found at St Peter's in the Hawkesbury River region of New South Wales. Paracyclotosaurus are reptiles and an extinct distant relative of today's Giant Salamander and whilst they spent most of their time in the water they were also able to move about on land.

Even though Paracyclotosautas had a big flat head like a crocodile, they only had fairly small teeth. To catch their prey they would lie still and wait for a fish to pass close by and quickly snap their jaws to catch and swallow it.

How to Say It: Pa/ra/sigh/clo/toe/saw/rus
Name Means: Round Eared Lizard
Family Group: Capitosauridae
Period: Middle Triassic
Where Found: Australia, India and South Africa 1st
Discovered: Davidi species 1910
Size: up to 2.3 metres in length
Food: fish
Special Features: Extra wide jaw for snapping up prey.

Paracyclotosaurus



Anglerfish

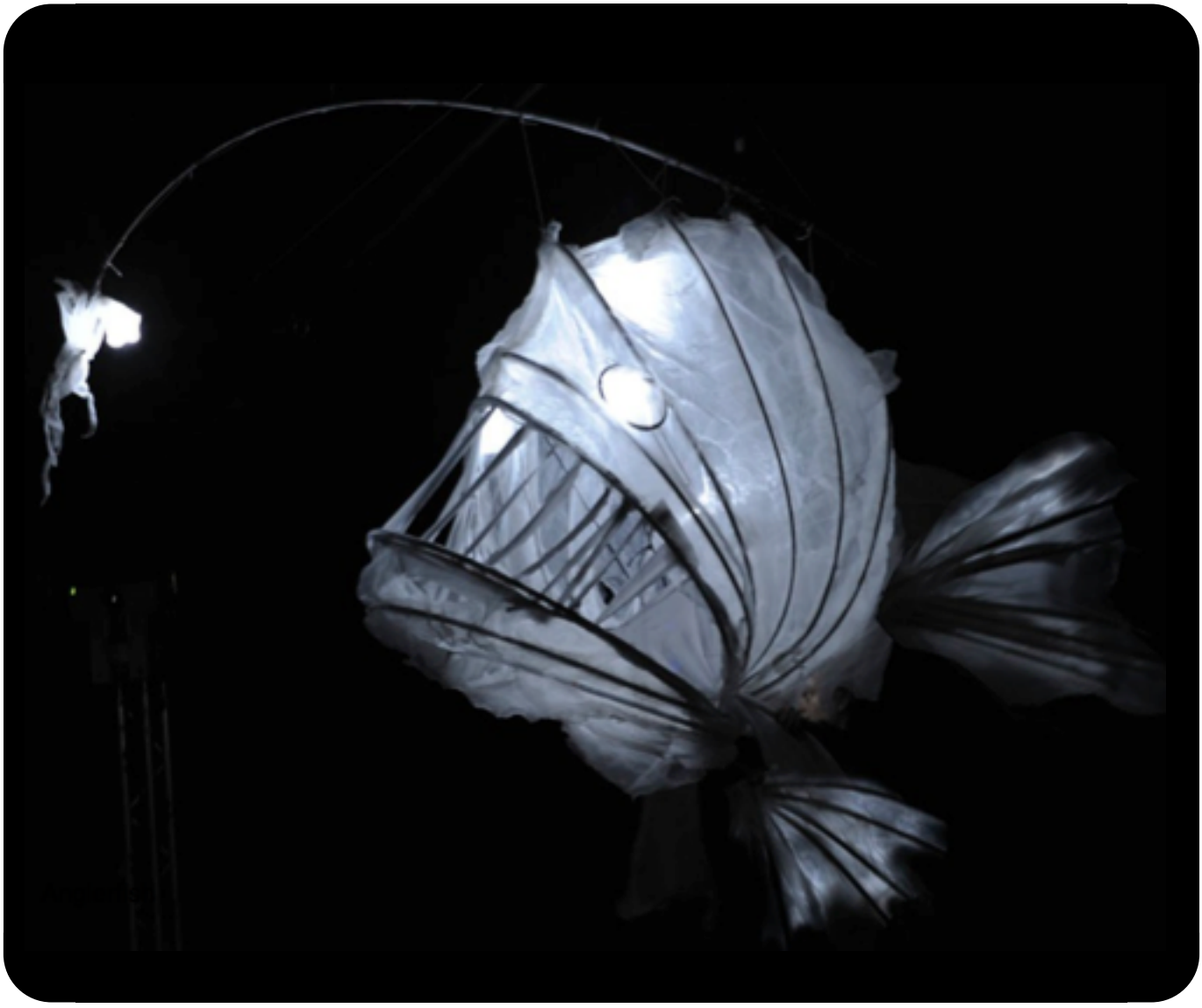
Deep-sea Anglerfish have been found off the coast of Queensland.

Anglerfish have survived in the deep, dark depths of the ocean since prehistoric times. They have been found as deep as 1400 metres, where there is no light. The female of the species uses a luminous fishing rod like structure to lure prey towards her mouth. She has a very large mouth which allows her to eat fish up to twice her size!

Male anglerfish are very small compared to the female and have a parasitic relationship. When they find a female to mate with they bite her on her side and hold on with their teeth. Over time the wound heals and the two fish are permanently stuck to each other.

How to Say It: Ang/ler/fish
Name Means: named for their method of catching prey. Angler is a synonym of fishing.
Family Group: Lophiiformes
Period: Paleogene
Where Found: Worldwide Size: up to 1.2 metres
Food: fish and invertebrates
Special Features: bioluminescence

Anglerfish



Plesiosaurus

The Plesiosaurus was an aquatic reptile with a long neck and a small head.

Plesiosaurs should not to be confused with their cousins Pliosaurs who had short necks and large heads and were very good hunters.
Plesiosaurs lived in both fresh water and salt water either in lakes or rivers or in the ocean close to the shore. Whilst the plesiosaurus was very large, it was not very fast. Its long neck was out of proportion to its short rounded body with four protruding flippers and short tail.

The Plesiosaurus used its long neck by swinging it from side to side in the water to catch fish. They also ate small stones to help break down the fish in their stomachs. There are some people who believe that Plesiosaurs still exist, in places like Loch Ness in Scotland, although this has never been proven.

How to Say It: Please/zee/o/saw/rus
Name Means: almost lizards
Family Group: Pliosauridae
Period: Cretaceous
Where Found: Worldwide 1st
Discovered: 1821 Size: 4.5 metres
Food: fish
Special Features: Pleisosaurs laid eggs in nests like turtles.

Plesiosaurus babies



Plesiosaurus mama



Kronosaurus

The Kronosaurus was one of the top predators in the ocean. The Kronosaurus is named after Kronos, the king of Titans, who were giants in Greek mythology. They had short necks and large heads, their limbs were four paddle-like fins. Kronosaurs were the biggest of the Pliosaurids and able to swim very fast. They had no need for stealth when hunting as they could swim faster than their meals.

Kronosaurs used the rounded teeth at the back of their mouth for crushing the shells of ammonites, cousins to the modern day nautilus. The sharp pointed teeth at the front of its mouth were used to capture its prey. Kronosaurus lived in the cool, high-latitude Eromanga Sea - an inland sea that covered vast areas of inland Australia from 120-90 million years ago. Fossilised Kronosaurs have been found near Hughenden in north-central Queensland.

How to Say It: Crow/no/saw/rus
Name Means: Kronos lizard
Family Group: Pliosauridae
Period: Cretaceous
Where Found: Australia and Colombia 1st
Discovered: 1899 Size: 8-10 metres long
Food: large fish, giant squid and ammonites and pleisosaurs
Special Features: Super speed, Kronosaurs used both their forelimbs and hind limbs to propel them.

Kronosaurus



Prehistoric Oceans

Ediacaran period

Scientists believe the Ediacaran period began after meteors hit the earth around the world, causing a chain reaction. The Earth changed from being a giant snowball where only single celled creatures lived in the ocean to a warmer and more fertile place with more complex creatures. The first evidence of this was found in the Ediacara Hills north of Adelaide. Remember in much of the prehistoric era, what is now Australia, was the ocean floor.

The Charniodiscus, Dickinsonia rex, Kimberella lived during this era.

Cambrian Period

The evolution of the oceans continued in the Cambrian era, creatures that could swim, crawl, burrow, hunt, hide and defend themselves began to appear. At this time there was still no life on land.

Anomalocaris was the apex predator of the Cambrian era; its name means abnormal shrimp. Fossils of its complex compound eyes have been found at Emu Bay on Kangaroo Island, South Australia.

Prehistoric Oceans

Triassic Period

The Triassic period was 200 million years after the Cambrian era; this is when the supercontinent Pangaea began to break up into smaller land masses. Europe separated from Africa and the ocean that filled the space began to push against the Americas causing South America to move further away from North America. This created the North and South Atlantic Ocean.

The Triassic period is when Paracyclotosaurus lived. Different species of Paracyclotosaurus fossils have been found in Australia, India and South Africa. The new oceans caused barriers that isolated the reptiles from one another. Animals evolved differently to fit in with their different environments.

Cretaceous Period

During the Cretaceous Period sea levels were the highest they had ever been. The whole of England was under water. There were no ice caps during this time, it was very warm.

The land masses of North and South America shifted further away from Europe and Africa which caused the Indian Ocean to form. Lepidotes , Plesiosaurs and Kronosaurs were all alive during this period. The Cretaceous period is famous as it ended with the extinction of the dinosaurs that lived on land.

Fossils found state by state

Evidence of the creatures found in Erth's Prehistoric Aquarium have been found in Australia.

Activity: Using an atlas pinpoint the locations where these species have been found in Australia:

- Paracyclotosaurus – Hawkesbury River, New South Wales
- Anglerfish – Coral Sea, Queensland
- Kronosaurus Queenslandicus – Hughenden, north central Queensland
- Pliosaur - Coober Pedy, South Australia

Opalised Fossils

Cooper Pedy is famous for its opals and its opalised fossils. It was here that an entire opalised pliosaur fossil was found: Eric. These are no ordinary fossils (if there is such a thing), these incredible relics are made of solid opal, sometimes with rainbows of shimmering colour.

'Eric' was a small pliosaur, about the size of a seal, he was 2.5 metres long. Eric had a long neck and a small head, which makes him unique amongst pliosaurs; usually they have short necks and large heads. He also had a keel on his snout and a ridge running along his spine to allow him to be a fast swimmer. He lived during the Cretaceous period in the Eromanga Sea; where Coober Pedy is now.

These fossils are of global scientific interest and are amongst the most beautiful and valuable fossils in the world. Australia is the only place on Earth where opalised animal fossils have been found. Image: Opalised pine cones. Note the variety in shape and size.



How do opalised fossils form?

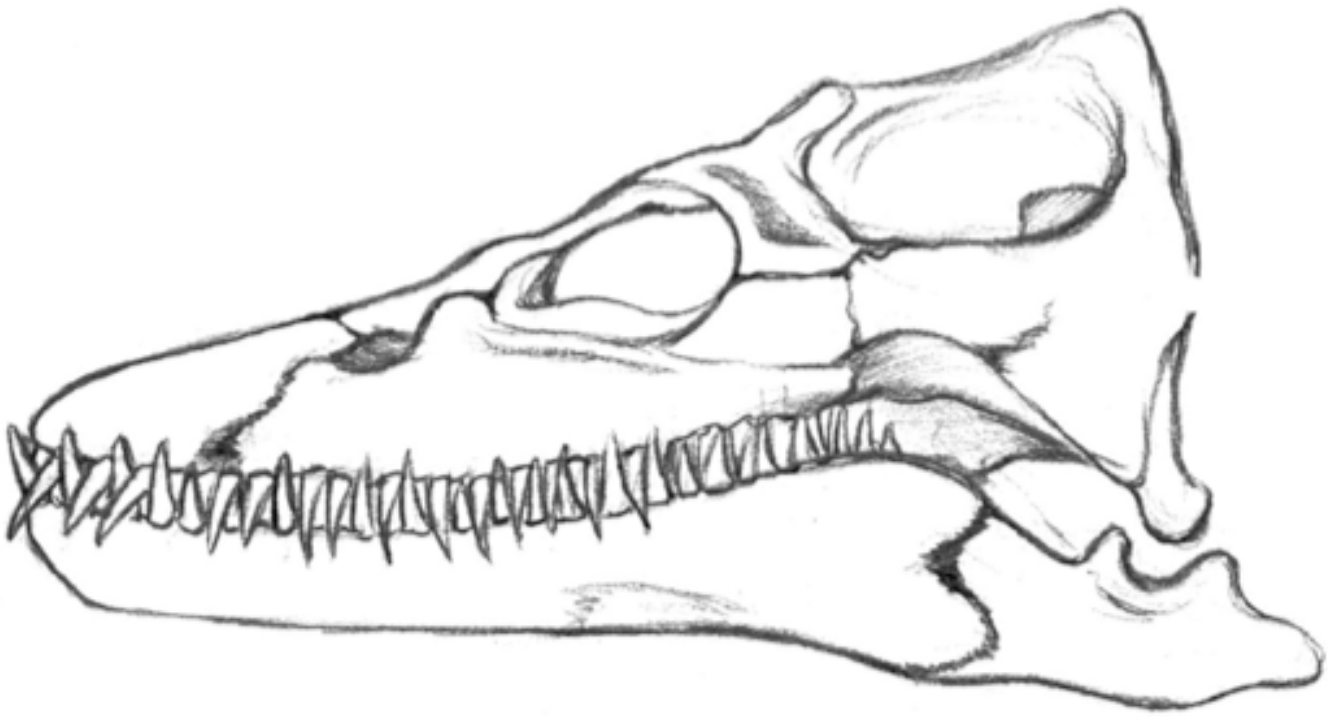
Opal forms in cavities within rocks. If a cavity has formed because a bone, shell or pinecone was buried in sand or clay that later became rock and the conditions are right for opal formation, then the opal forms a fossil replica of the original object that was buried.

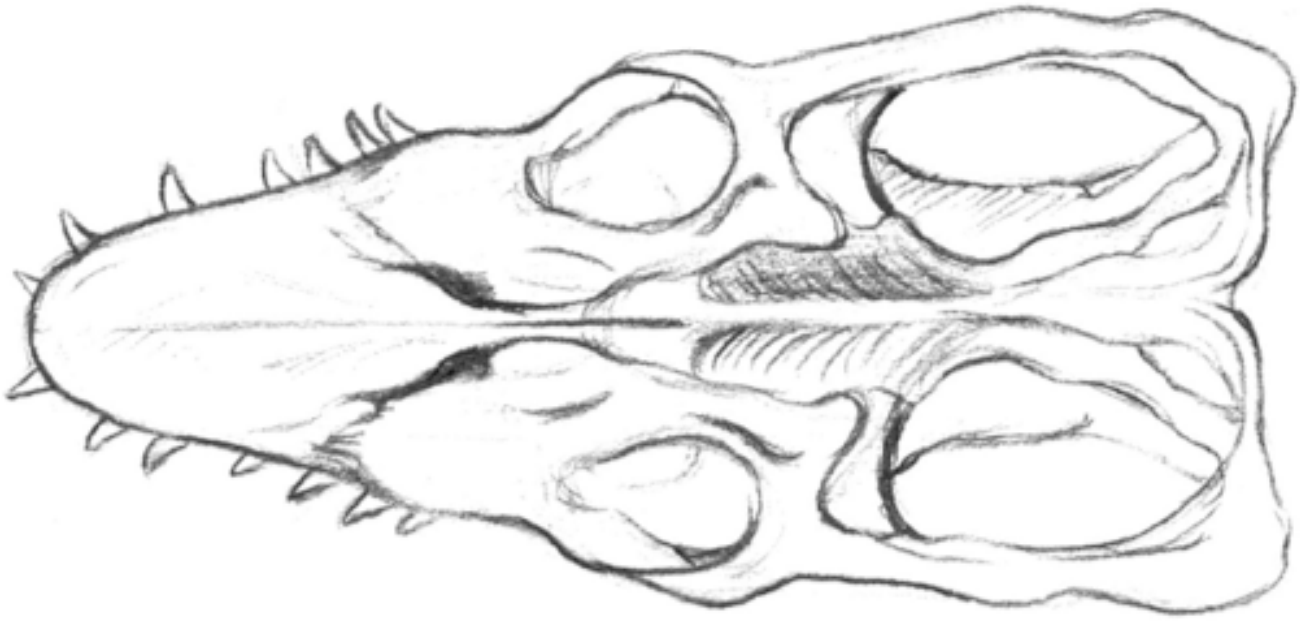
There are two types of opalised fossil

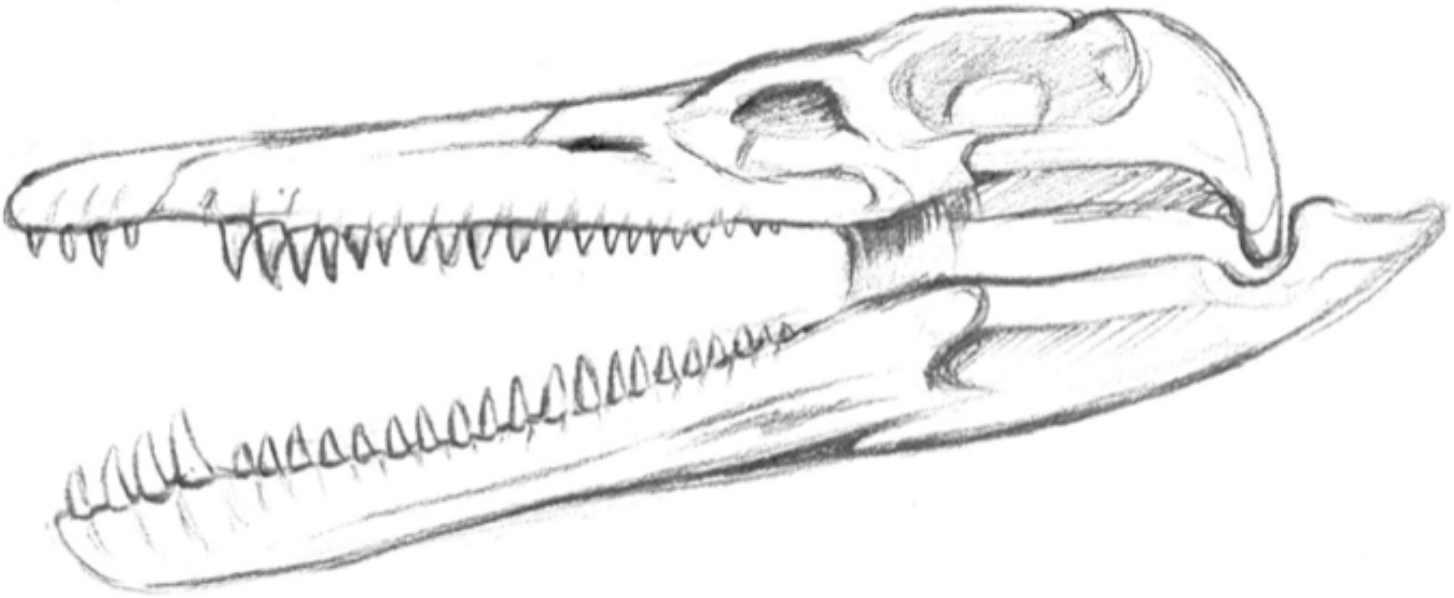
i) Internal details not preserved. Opal starts as a solution of silica in water. If the silica solution fills an empty space- left by a bone/shell that has rotted away, it may harden to form a cast of the original object. Most opalised shell fossils are this type of fossil – the outside shape is beautifully preserved, but the opal inside doesn't retain any of the creatures internal structure.

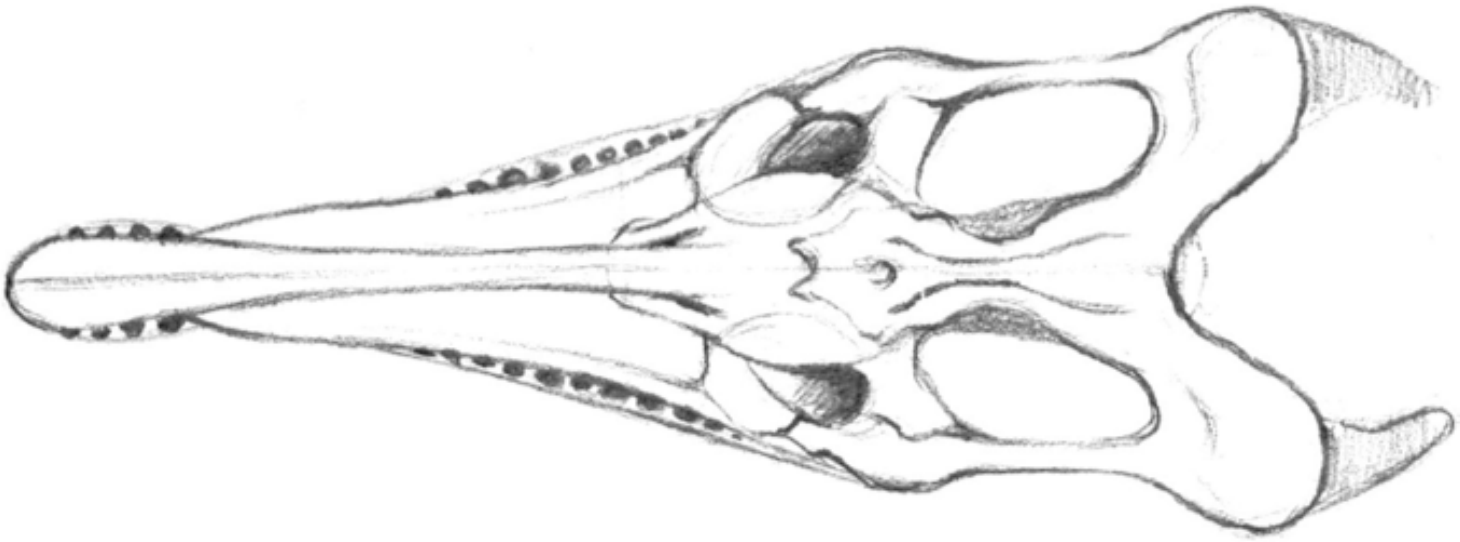
ii) Internal details preserved. If the buried organic material has not rotted away and a silica solution soaks into it, when the silica hardens it may form an opal replica of the internal structure of the object. This happens sometimes with wood or bone.

Activity: Opals are many colours mixed together: pink, blue, purple, yellow, green and turquoise. Colour in the fossils to make your own image of an opalised fossil.









About the Puppets

In Erth's Prehistoric Aquarium some of the creatures are portrayed by puppets. A puppet is a figure whose movements are controlled by someone through strings, rods or hand/body movements.

The main style of puppetry used in Erth's Prehistoric Aquarium is a modified style of "Bunraku" (bunrah-koo) puppetry, a form of puppetry that originated in Japan over 400 years ago. In Bunraku, there are usually several puppeteers who manipulate the puppet directly and are visible throughout the play rather than being hidden.

Usually 3 puppeteers will operate 1 puppet. In Bunraku, each puppeteer is responsible for moving a different part of the body. Puppetry in Japan is highly regarded. Bunraku is directly related to the "kabuki," mime theatre tradition and at one time was considered the highest form of theatre in Japan, with the greatest writers and actors of the day creating work exclusively for Bunraku performances.

Many plays were written that are similar to Shakespearean dramas, with detailed language and complex plots. Bunraku plays are still performed today in Japan; a master puppeteer spends a lifetime perfecting manipulation of his puppet.

Make your own puppet!

Paper rod puppet

You will need:

- Card paper
- Sticky tape
- Wooden sticks (pop sticks or chop sticks can be used)
- Pencils and colouring pencils or markers

1. Choose the Paracyclotosaurus, Anglerfish, Kronsaur or Plesiosaur.
2. Read the information on their fact page.
3. Use this information to draw a picture of the creature you have chosen. Make sure to colour it in and add lots of detail.
4. Cut out the drawing and attach it to a wooden stick with tape
5. In small groups create a story for your creatures; they will be the characters in your puppet show. Think about how they each behave, for example the Plesiosaur was a slow moving reptile who ate small fish and the Kronosaur was a fast hunter of big prey, sometimes even baby plesiosaurs!
6. Use your rod puppets to perform the story.

Make your own puppet!

Rod puppet

You will need:

- Old umbrella
- Fabric or crepe paper of various colours in strips
- Staplers

1. Think about the Moon Jellyfish you saw in Erth's Prehistoric Aquarium. What did they look like? How did they move?
2. Open your umbrella; can you see how it resembles a Moon Jellyfish? The handle becomes the rod of your Moon Jellyfish and the canopy becomes its body.
3. Staple strips of fabric or crepe paper to the canopy of the umbrella to create the tentacles of your Moon jellyfish puppet.
4. When you have finished decorating your puppet practise making it move like it is underwater. The button that you use to open and close the umbrella can be used to make the puppet look like it is swimming. You will need to also move up and down with your knees.

Remember when you are puppeteering that you also have to move like the creature, that way your puppet will too.

Reflection Time

We hope you enjoyed Erth's Prehistoric Aquarium!

Now you have seen the show - we hope you have lots to talk about and will have a lively discussion all about it! Use the following questions to start the discussion.

1. What did you see in the show?

3. Can you remember any facts?

4. Did you join in with any parts of the show?

6. What was your favourite prehistoric creature?

Reflection Time

In small groups:

• Discuss your favourite part of the show.

• Decide on one moment to recreate. • Decide who will play each character. Remember there is the scientist, the host, single celled organisms and jellyfish, prehistoric fish: the Anglerfish and prehistoric reptiles: the paracyclotosaurs, plesiosaurus and kronosaurus to choose from.

• Think about the action in the moment and how you will move and sound.

• Decide whether you want to perform the moment as a play or as a dance.

• What type of music fits in with the action? It is curious and happy for the Bioluminescent Jellyfish or is it scary and fast to show the Kronosaur hunting the baby Plesiosaur?

• Rehearse and perform the moment.

Reflection Time

Individually:

• Decide on your favourite creature in Erth's Prehistoric Aquarium.

• Create a picture of your favourite creature in its environment. Remember some Plesiosaurs lived in rivers and lakes and the Anglerfish lives in the darkest part of the ocean.

• You can create your picture by drawing and colouring or you could make a collage using a computer .

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