

香港科學館 · 古生物展廳

HONG KONG SCIENCE MUSEUM · PALAEONTOLOGY GALLERY

滅絕

· 新生

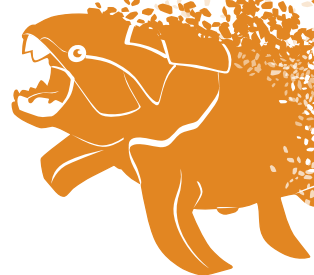


EXTINCTION · RESILIENCE



趣味習作 Activity Sheet

中學程度 Secondary Level



化石的種類

TYPES OF FOSSILS

為了解地球過去的生命，古生物學家需要研究化石。化石是古生物所遺留下來的遺骸、印痕或痕跡。你能幫忙形成以下五種化石嗎？（提示：看看互動展品「生物定格」）

To uncover life from the past, palaeontologists study fossils, which are the preserved remains, impressions or traces of prehistoric organisms. Can you complete the formation processes for these five types of fossils? (Hint: Check out interactive exhibit “BEFORE THEY VANISH”)



化石類型：封存的遺體



例子：琥珀中的 _____，瀝青或 _____ 中的猛獁象

形成方法：生物被困於 _____ 中，或在嚴寒環境下被保存。

Fossil type: Preserved remains

Examples: _____ in amber, mammoth in tar or _____

Formation: Organism is trapped by _____, or preserved under extreme coldness.



化石類型：碳化化石



例子：植物和昆蟲

形成方法：生物受到巨大的 _____ 作用後留下的碳質薄膜。化石反映出生物原來的外部平面構造，其他的 _____ 則已消失。

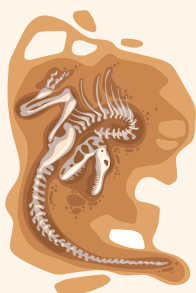
Fossil type: Carbonised fossils

Examples: Plant and insect

Formation: Organism is preserved as carbon film under _____ and _____, showing its original structure. The other _____ are dissipated.



化石類型：礦化化石



例子：骨骼，木和牙齒

形成方法：當 _____ 滲入生物時，_____ 會沉積在有機組織的孔隙中，其後結為晶體及硬化，使生物能夠保存下來。

Fossil type: Permineralised fossils

Examples: Bone, wood and tooth

Formation: When _____ seeps through an organism, it deposits _____, crystallises, then hardens and preserves the organisms by filling the pore spaces of the organic matter.

化石類型：痕跡化石

例子： 腳印，地洞， _____ 和 _____

形成方法： 當生物經過 _____ 的表面時會留下印痕，隨後被 _____ 覆蓋而形成化石。這些化石可提供關於生物的速度、重量和生活模式的線索。

Fossil type: Trace fossils

Examples: Footprint, burrow, _____ and _____

Formation: These fossils are impressions left by organisms moving over _____ and _____ surfaces which are then covered by _____. These provide information about the organism's speed, weight, and mode of life.



化石類型：模鑄化石

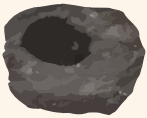
例子： 骨骼和貝殼

形成方法： 沉積物在生物堅硬的身體部分四周堆積，從而形成印有生物外表細節的 _____。遺體其後分解，礦物填充空隙，形成生物的 _____。

Fossil type: Moulds and casts

Examples: Bone and shell

Formation: Sediments form around the organism's hard body parts, imprinting external details on the _____. As the original remains dissolve, minerals fill the cavities, leaving a _____ of the organism.



你最喜歡哪件化石？

古生物展廳展示了來自不同地質時期的化石，你最喜歡哪一組？嘗試辨別它屬於哪種化石類型。

Which Fossil is Your Pick?

The Palaeontology Gallery showcases fossils from different geological time periods. Which fossil is your favourite? Try to identify the specific type of fossil it belongs to.

生命的演化

THE EVOLUTION OF LIFE

生命自37億年前出現在地球上以來，便繁衍不息。你能排列以下生物出現的次序嗎？

Life has flourished on our planet since its emergence 3.7 billion years ago. Can you arrange the sequence of appearance of the following organisms starting from the oldest?



鳥類
Birds



魚類
Fishes



無脊椎動物
Invertebrates



細菌
Bacteria



爬行動物
Reptiles



兩棲動物
Amphibians



哺乳動物
Mammals

遠古海洋

THE PREHISTORIC OCEANS

仔細觀察埃迪卡拉紀、寒武紀和奧陶紀時期蓬勃發展的各種動物，回答以下問題。

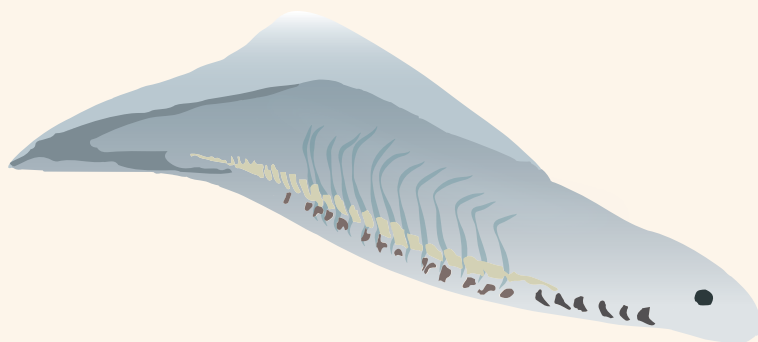
Take a closer look at the diverse array of animals that thrived during the Ediacaran, Cambrian and Ordovician periods in order to answer the following questions.

試列舉兩項地球上最早的動物的共同特徵。

Please list out two common characteristics of the earliest animals on Earth.

哪種動物可能是脊椎動物的祖先？牠有甚麼特殊的身體特徵？（提示：觀看寒武紀動畫）

Which animal could have been the ancestor of vertebrates? And what special body feature did it have? (Hint: Watch the Cambrian animation)



魚類時代

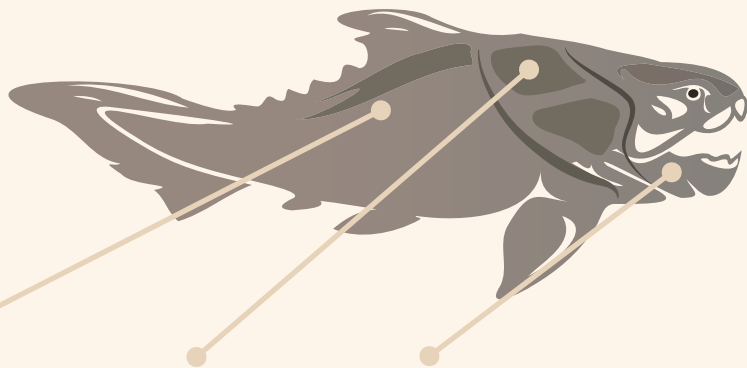
THE AGE OF FISHES

魚類是最早發展出多項非凡身體特徵的生物之一。在泥盆紀時期，海洋裏出現了一類名為盾皮魚的魚類。你能寫出現代魚類和已滅絕的盾皮魚的主要分別嗎？

Fishes are among the first lifeforms to develop several remarkable body features. During the Devonian period, a group of placoderms, also known as armoured fish, thrived in the ocean. Can you tell the key difference between modern fishes and extinct placoderms?

試找出鄧氏魚，觀察牠的身體特徵並配對其功能。

Find *Dunkleosteus*, observe its body features and match them with their functions.



肌肉發達的巨大身體
Large and muscular body

盾甲
Armour

強大的頷
Powerful jaws

口腔中鋒利的骨板
Razor-sharp bony plates in its mouth

保護牠免受攻擊
Shield it from attacks

提供強大的咬合力
Deliver a powerful bite force

切割獵物
Slice its prey

提供制服獵物的力量
Provide strength to overpower its prey

從水到陸地

FROM WATER TO LAND

某些魚類和原始四足動物演化出獨特的身體特徵，讓牠們能夠從水裏逐漸過渡至適應陸地生活，試找出這些動物並寫下牠們的名字。(提示：看看「第二次大滅絕」對面牆上的文字和動物模型，以及互動展品「登陸先鋒」)

Some fishes and early tetrapods evolved specialised body features in order to transit from water to land. Let's find them out and write down their names. (Hint: Take a look at the texts and animal models on the walls opposite to "SECOND MASS EXTINCTION", and the interactive exhibit "LAND FORERUNNER")



名字 Name:

牠是一種魚類，同時擁有肺、鰓以及四肢的雛形——肉鰭。

It was a fish with lungs and gills at the same time, and the precursors of limbs – lobed fins.



名字 Name:

牠是魚類和四足動物之間的過渡物種，擁有兩者的特徵。

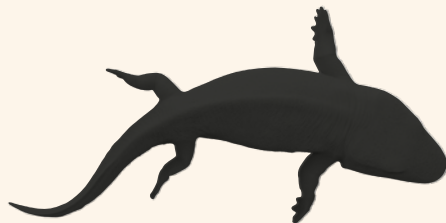
It was an intermediate between fish and tetrapods. It had characteristics of both of them.



名字 Name:

牠有明顯四肢及前肢有八趾，但仍留有鰓和像魚一樣的尾巴。

It had four recognised limbs and eight digits on its forelimbs, but it still had fishy features such as gills and a fish-like tail.



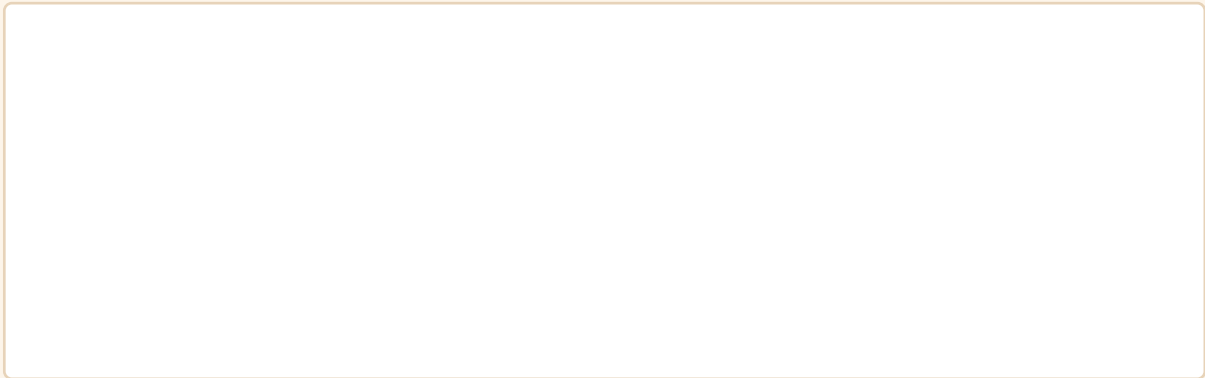
名字 Name:

牠是水生四足動物，有粗壯的四肢，相信能像彈塗魚般在地上爬行。

It was an aquatic tetrapod with robust limbs. It might have been able to pull itself along on land like a mudskipper.

羊膜動物由早期四足動物演化而來，牠們能生產出在陸上孵化的「羊膜卵」。為甚麼羊膜卵能夠在陸上孵化？（提示：看看互動展品「森林搜索隊」）

Amniotes evolved from early tetrapods and developed the ability to lay a special type of egg called an “amniotic egg”. What make amniotic eggs special in terms of land hatching?
(Hint: Check out interactive exhibit “PALAEO-RANGER”)



沒有四足的四足動物

從魚鰭演化成四肢，以至出現真正能以四足行走的動物，歷時超過2,500萬年。「四足動物」包括擁有四肢的動物，以及曾擁有四肢、但後來在演化過程中改變或失去了它們的動物，例如鯨魚和蛇。

Tetrapods without Four Legs

The transition from fins to limbs spanned over 25 million years until the emergence of the first true tetrapod, capable of walking on land. Tetrapod, which means four legs in Greek, includes animals with four limbs, and those whose ancestors had them but have since modified or lost them during the evolutionary process, such as whales and snakes.

為甚麼羊膜動物需要離開水生環境，擴展至不同的陸上生境生活？

Why did amniotes have to leave the aquatic environment and spread around different terrestrial habitats?

早期的羊膜動物演化出兩個分支，分別是蜥形綱和合弓綱。以下動物屬於哪一類？將代表動物的英文字母填入正確的格內。

The early amniotes gave rise to two distinct clades: Sauropsida and Synapsida. Which clade do the following animals belong to? Put the corresponding letters into the correct box .

A. 海龜
Sea Turtle



B. 海豚
Dolphin



C. 鸚鵡
Parrot



蜥形綱 Sauropsida:

D. 斑馬
Zebra



E. 恐龍
Dinosaur



F. 袋鼠
Kangaroo



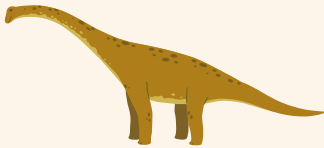
合弓綱 Synapsida:

鳥類從何而來？

WHERE DO BIRDS COME FROM?

鳥類的祖先可追溯至恐龍時代。你知道鳥類是由哪一類動物演化而來嗎？請圈出答案。

The ancestors of birds can be traced back to the age of dinosaurs. Do you know which group of animals did birds evolve from? Circle the answer.



始祖鳥是一種小型的獸腳類恐龍，同時具有爬行動物和鳥類的特徵，在研究恐龍與鳥類之間的演化關係中扮演重要角色。始祖鳥有哪些特別之處？
(提示：看看展品「恐龍與鳥」)

Archaeopteryx, a small-sized theropod dinosaur possessing both reptilian and avian features, played a crucial role in understanding the evolutionary relationship between dinosaurs and birds. What's special about *Archaeopteryx*? (Hint: Check out exhibit "DINOS AND BIRDS")

爬行動物特徵 Reptilian features	鳥類特徵 Avian features

劫後餘生

THE AFTERMATH

哪一次大滅絕事件讓不會飛行的恐龍（非鳥翼類恐龍）滅絕？原因又是甚麼？

Which mass extinction event led to the extinction of dinosaurs that were unable to fly (non-avian dinosaurs), and what caused it?

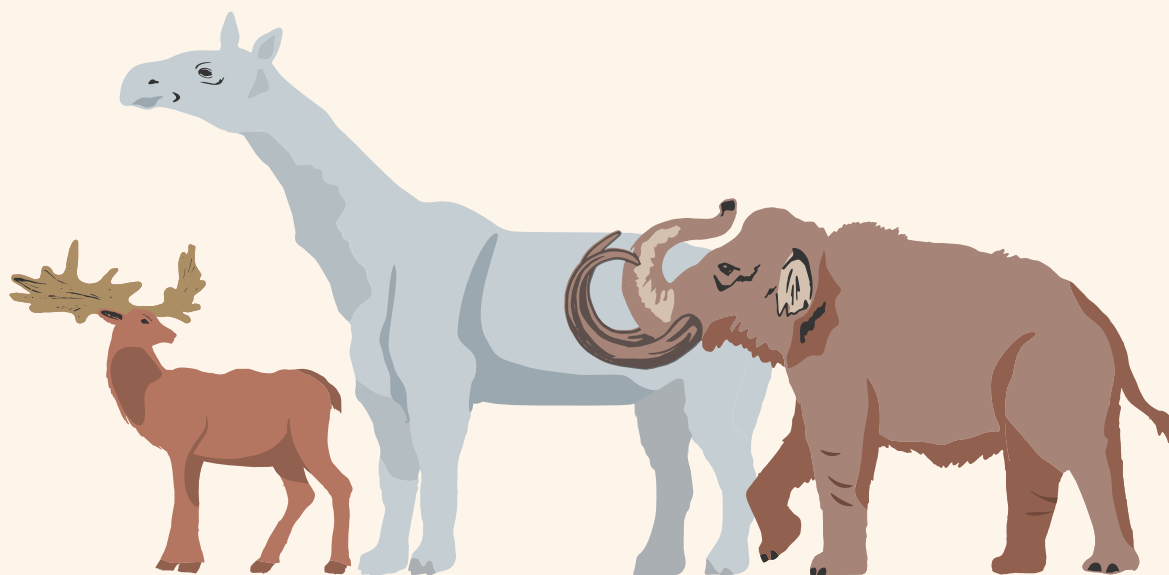
發生在 _____ 萬年前的 _____ 大滅絕導致非鳥翼類恐龍滅絕。
這次大滅絕相信是由 _____ 所引致。

Non-avian dinosaurs became extinct during the _____ Mass Extinction, which happened _____ million years ago. This event is believed to have been caused by an _____.

在非鳥翼類恐龍滅絕之後，哪個動物群體趁機佔領主導地位？

Which group of animals became dominant after the extinction of non-avian dinosaurs?

- a) 魚類 Fishes
- b) 鳥類 Birds
- c) 昆蟲 Insects
- d) 哺乳類 Mammals
- e) 兩棲類 Amphibians



為甚麼非鳥翼類恐龍的滅絕有利於這些動物的崛起？

Why was the extinction of non-avian dinosaurs important for the rise of the animals above?



小型先驅者

哺乳動物約在二億年前的三疊紀晚期至侏羅紀早期出現。原始的哺乳動物與恐龍共存，體型相對較小，約為獾類至田鼠般的大小。在恐龍時代結束後，哺乳動物持續演化和繁衍，體型日益變大，且出現多樣化的物種。

Little Pioneers

Mammals emerged approximately 200 million years ago during the time of late Triassic to early Jurassic. Early mammals coexisted with dinosaurs and were relatively small in size, ranging from badger-like creatures to tiny voles. In the post-dinosaur era, mammals continued to evolve and expand, growing in size and diversity.

第六次大滅絕與保育

THE 6TH MASS EXTINCTION AND CONSERVATION

人類是現正進行中的大滅絕的幕後主使。參觀展廳內的展品「保育為未來」，將以下動物及保育牠們的行動配對。

Humans are the main culprit of the on-going mass extinction. Visit our exhibit “CONSERVING FOR THE FUTURE” and match the following animals with the corresponding conservation actions.



反盜獵巡邏、建立保護區和調解
牧民與捕食者之間的衝突

Anti-poaching patrols, protected area
establishment and herder-predator conflict mediation



修復受損棲息地和建立築巢區域

Habitat restoration and establishment of nesting areas



生態系統評估、重新引入、拯救和復康治療

Habitat assessment and repopulation,
rescue and rehabilitation



建立保護區、反盜獵巡邏和
工程調控措施

Protected area establishment, anti-poaching
patrols and infrastructure adaptations



飼育、放歸和設置餵食站

Breeding, reintroduction and
supplementary feeding

你知道其他瀕危物種的保育故事嗎？分享令該物種瀕臨滅絕的原因，以及我們可以採取甚麼措施來保護牠。

Do you know any conservation stories about other endangered species? Share how this species became endangered and what we can do to protect it.

香港化石

HONG KONG FOSSILS

香港也有化石！你知道香港曾發現哪些生物的化石嗎？在對應的圓圈內加上「✓」。

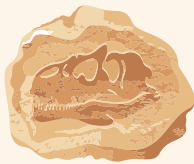
Hong Kong has fossils too! Do you know what kind of fossils have been discovered in Hong Kong? Put a "✓" in the corresponding circles below.



魚類
Fishes



植物
Plants



恐龍
Dinosaurs



菊石
Ammonoids



長毛象
Woolly mammoths



在香港哪裏可以找到化石？
在地圖上圈出你認為能找到化石的地方。

Where in Hong Kong can we find fossils? Circle the locations on the map if you think there are fossils.



物種的適應力

ADAPTATION OF SPECIES

你正在進行一次探索古生物之旅，了解古生物如何適應環境求存。以下是你需要做的事情：

You are on an exploration trip to discover prehistoric organisms and their remarkable adaptations for survival. Here's what you need to do:

1. 選擇兩個你感興趣的地質時期

Choose two geological periods that capture your curiosity

2. 在這兩個時期各找一種有高適應力的物種並將牠們繪畫出來

Find a well-adapted organism from each chosen period and draw them out

3. 描述這兩個物種如何適應環境（你可以參考這些關鍵詞：捕食者、流線型身體、四肢、頷、獵物、繁殖、體型大小）

Describe how these two organisms adapted to their environments (Key words you may think about: predator, streamlined body, limbs, jaw, prey, reproduction, body size)

1.) 地質時期 Geological period:	2.) 物種名稱 Species name:
<hr/>	<hr/>
3.) 圖畫 Drawing:	4.) 主要特徵 Key features:
<hr/>	<hr/>
5.) 這些特徵如何幫助生物適應環境及成長？ How these features helped the organism adapt and thrive?	
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How these features helped the organism adapt and thrive?

未來的生命

THE FUTURE LIFE

生命一直在持續演化，試想像並畫出一種未來的物種，介紹牠演化出甚麼特徵，以及如何在棲息地中生存。

Life has always been evolving. Imagine and draw a future species, describing its evolved features and how it survives in its habitat.

身體特徵及功能：

Body features and functions:



如何為物種命名？

科學家使用二名法命名生物物種。每個物種的學名都包含兩個部分，例如赫氏近鳥龍 *Anchiornis huxleyi*，其中近鳥龍 *Anchiornis* (希臘語中的意思為「接近鳥類」) 是屬名，赫氏 *huxleyi* 則是種名。一般而言，我們可基於生物特徵、所在地，或紀念重要人物來命名。例子中的 *huxleyi* 是為了紀念提倡達爾文的進化論的托馬斯·亨利·赫胥黎 Thomas Henry Huxley。你能用二名法來命名你的未來物種嗎？

How to Name a Species?

Scientists use binomial nomenclature to name species. Each species gets a scientific name with two parts. Take *Anchiornis huxleyi*, a dinosaur with close similarity to birds, as an example. “*Anchiornis*” (meaning “near bird” in Greek) represents the genus, while “*huxleyi*” is the name of the species. In general, the names can be derived from the characteristics, location, or as a tribute to influential individuals. In this case of “*huxleyi*”, it honours Thomas Henry Huxley, a proponent of Charles Darwin’s theory of evolution. Can you name your future species using binomial nomenclature?