飛龍在天_展品指南

簡介 **Introduction**

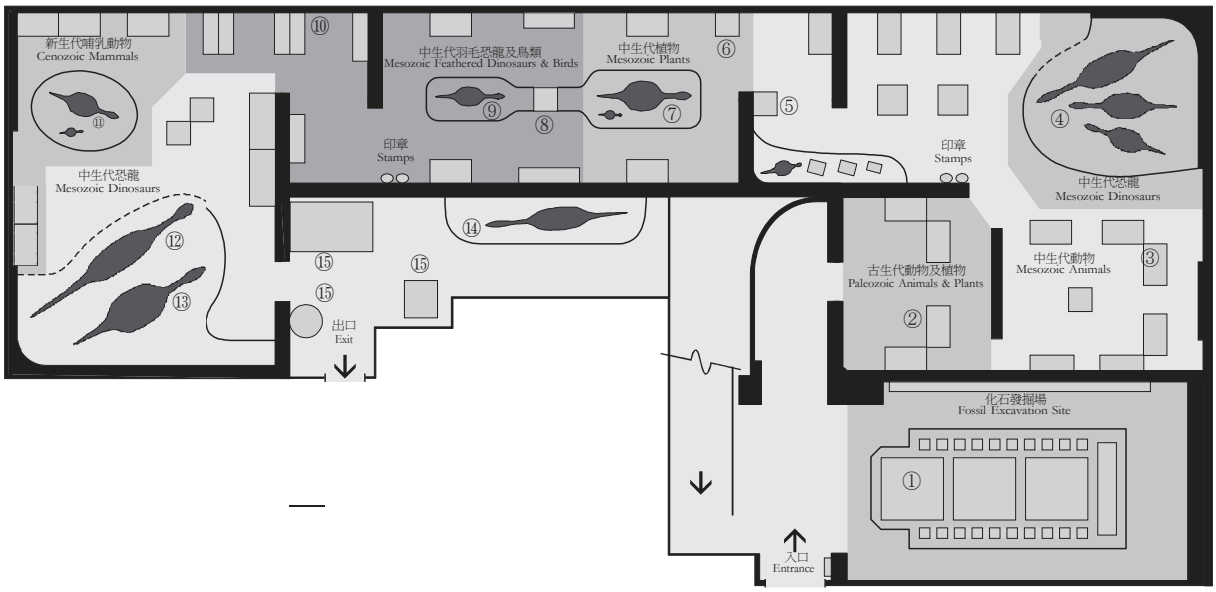
爲慶祝香港特別行政區成立十周年紀念，香港科學館在今年特別推出「飛龍在天
－中國恐龍與古生物展」專題展覽。

「飛龍在天－中國恐龍與古生物展」將展出約200件在中國發現並且保存得相當完整 的恐龍化石及其他古代動植物化石，它們都非常珍貴及極具科學價值，並從未在香港展出過。這些化石提供了線索，讓我們了解一些恐龍的演化過程，闡明了鳥 類、哺乳類動物和開花植物興盛的原因。

這次展覽的珍貴化石由中國地質科學院地質研究所、內蒙古博物館、重慶自然博物 館及祿豐恐龍博物館提供。展品包括從未在香港展出的化石如華美金鳳鳥、顧氏小 盜龍，牠們是現代鳥類的遠祖。此外，珍貴展品還包括在戈壁沙漠發現的查干諾爾 龍，及人類有史以來所發現體形最大的松花江猛獁象。

展品位置 **Exhibit Location**

地下展品佈置圖 G/F Exhibition layout

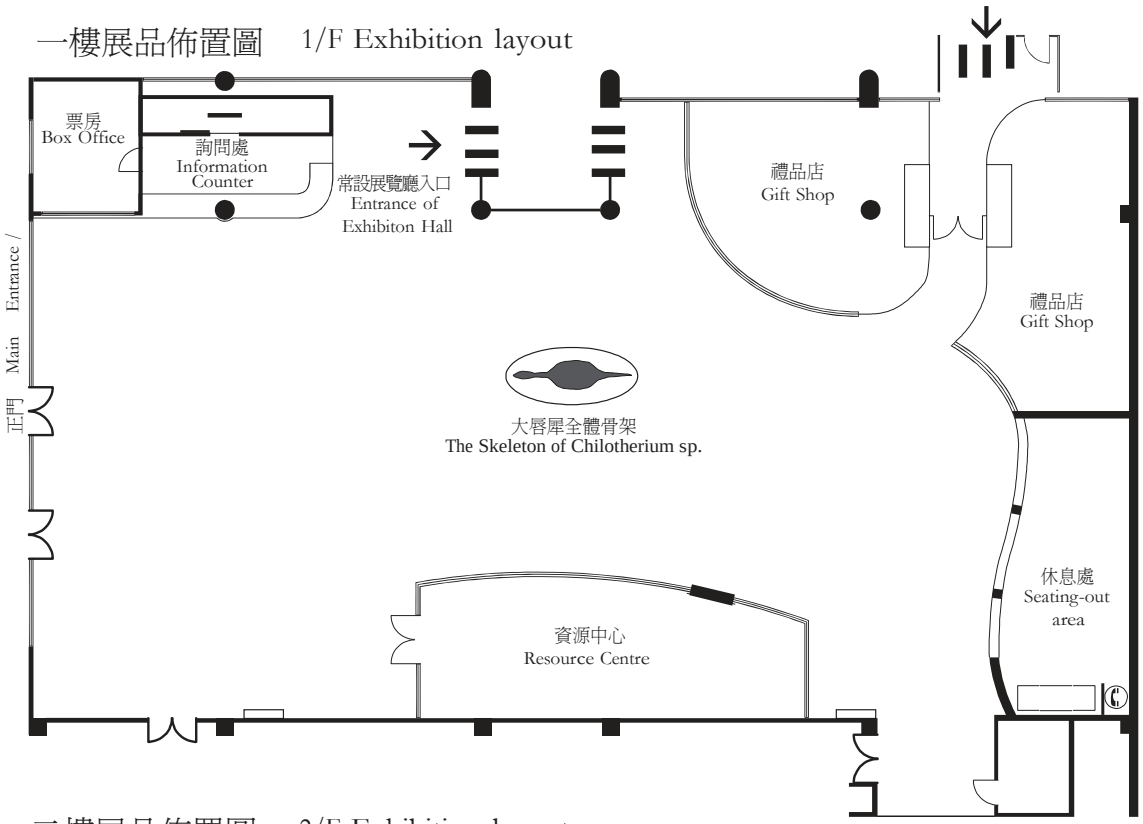


展品精華 Exhibit highlights

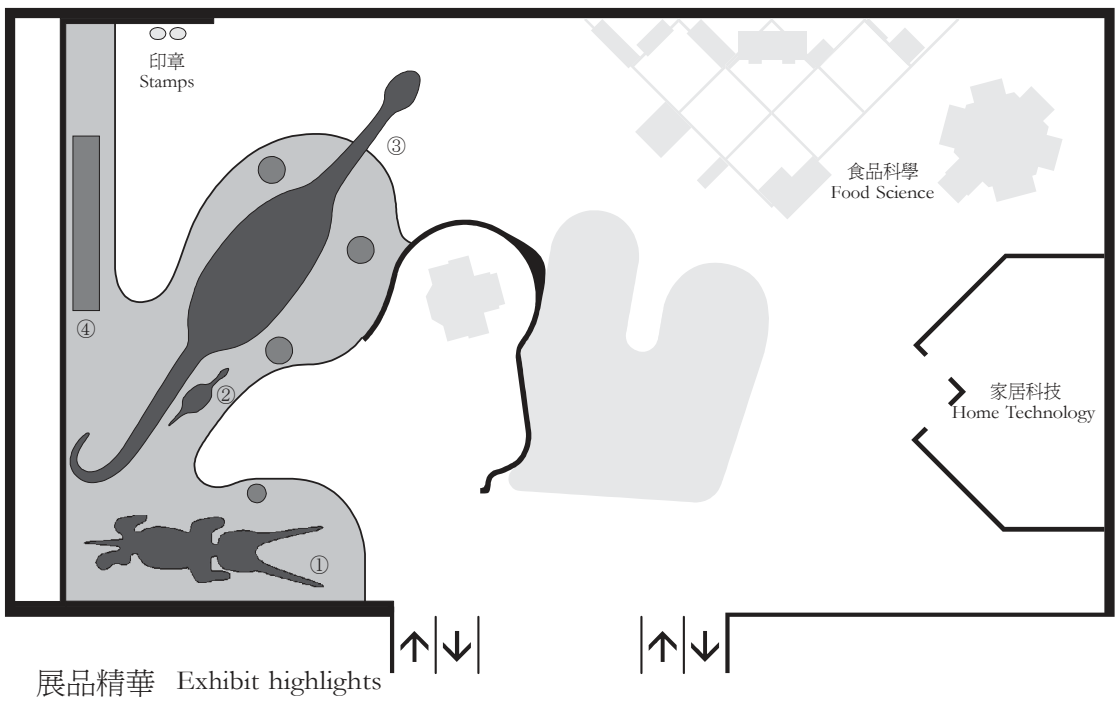
- 上游永川龍
  Yangchuanosaurus shangyouensis
- 雲南頭蟲
  Yunnanocephalus yunnanensis
- 白台溝潛龍
  Hyphalosaurus baitaigouensis
- 中國雙脊龍
  Dilophosaurus sinensis
- 攀援始祖獸
  Eomaia scansoria
- 遼寧古果
  Archaefructus liaoningensis
- 原角龍
  Protoceratops sp.
- 千禧中國鳥龍
  Sinornithosaurus millenii
- 古似鳥龍
  Archaeornithomimus sp.
- 華美金鳳鳥
  Jinfengopteryx elegans
- 披毛犀
  Coelodonta antiquitatis
- 禽龍
  Iguanodon
- 巴克龍
  Bactrosaurus sp.
- 三疊紀肉食恐龍
  A carnivorous dinosaur of the Triassic
- 互動展品
  Interactive exhibits

常設展覽廳出口
Exit of Permanent Exhibition Hall

一樓展品佈置圖　1/F Exhibition layout



二樓展品佈置圖　2/F Exhibition layout



展品精華　Exhibit highlights

- 松花江猛獁象
  Mammuthus sungari
- 江北重慶龍
  Chungkingosaurus jiangbeiensis
- 查干諾爾龍
  Nuoerosaurus chaganensis
- 硅化木
  Petrified wood

地質年代 **Geological Timescale**

地質年代[1] Geological Time		開始時間 Beginning		簡介 Remarks	代表生物 Representative organism
代 Era	紀 Period	百萬年前 Million Years Ago	日/月[2] Day/Month		
新生代 Cenozoic	第三紀[3] Tertiary Period	23	29/12	南方古猿於500萬年前出現，標誌著人類的起源。 *Australopithecus africanus* appeared 5 million years ago and marked the dawn of man.	人類 Human
		66	25/12	哺乳動物繁盛，部分體型巨大，亦有生活在海裏 (鯨類)和會飛的哺乳動物(蝙蝠)。 Mammal flourished and conquered the sea (whale) and the sky (bat). Some of them had huge sizes.	大唇犀 *Chilotherium*
中生代 Mesozoic	白堊紀 Cretaceous	146	19/12	恐龍的全盛時期，卻在６千５百萬年前的滅絕事件中消失。 Heyday of dinosaurs which ended abruptly in an extinction event 65 million years ago.	禽龍 *Iguanodon*
	侏羅紀 Jurassic	200	15/12	恐龍繁盛。部分恐龍演化成鳥類。開花植物出現。 Dinosaurs flourished. Some of them evolved into birds. Flowering plants occurred.	雙脊龍 *Dilophosaurus*
	三疊紀 Triassic	251	11/12	爬行動物演化出恐龍和哺乳動物。 Dinosaurs and mammals evolved from reptiles.	金山龍 *Jingshanosaurus*
古生代 Paleozoic	二疊紀 Permian	299	7/12	裸子植物繁盛；爬行動物體積增大。 Gymnosperms flourished. Reptiles became large.	異齒龍 *Dimetrodon*
	石炭紀 Carboniferous	359	2/12	陸上生物飛躍發展，爬行動物出現。蕨類植物形成森林，是現代煤炭的主要來源。 Terrestrial lives diversified. Reptiles occurred. Fern forests became the major source of coal.	蜻蜓 Dragonfly
	泥盤紀 Devonian	416	27/11	昆蟲和兩棲動物出現。 Insects and amphibians occurred.	魚類 Fish
	志留紀 Silurian	443	25/11	部分動植物開始向陸地發展。 Oldest land plants and animals appeared.	腕足動物 Brachiopods
	奧陶紀 Ordovician	488	22/11	無脊椎動物全盛時期。 Invertebrates flourished.	筆石 Graptolite
	寒武紀 Cambrian	542	17/11	寒武紀生物大爆發；海中湧現多種無脊椎動物。 後來亦出現了脊椎動物。 Cambrian Explosion. Many invertebrates emerged in sea. Vertebrates occurred later.	三葉蟲 Trilobite

元古代 Proterozoic	2500	15/6	單細胞生物出現，逐漸演變成多細胞生物。 Single-celled organisms occurred and evolved multi-celled organisms.	水母 Jellyfish
太古代 Archean	4600	1/1	地球形成。細菌於35億年前左右出現，後來出現能進行光合作用的藍藻菌。 The Earth formed. Bacteria occurred from 3.5 billion years ago. Cyanobacteria which performed photosynthesis occurred later.	藍藻菌 Cyanobacteria

[1] 參考國際地層委員會《國際地層表 (2004年)》
Refers to *International Stratigraphic Chart (2004)*, International Commission on Stratigraphy

[2] 將地球史按比例變爲一年，地球誕生爲1月1日，現今爲12月31日。
The Earth history is scaled down into a year. The earth formed on 1st January. Now is 31st December.

[3] 第三紀再細分爲中新世、上新世、更新世及全新世 (現代)。
Tertiary Period is further divided into Miocene, Pliocene, Pleistocene and Holocene (the present epoch).

═ Major Extinction Event 大型滅絕事件

展品選粹 **Exhibit Highlights**

強壯怪誕蟲 *Hallucigenia fortis*	怪誕蟲有七對骨刺和七對腳，和一個獨特的橢圓形頭部。是澄江生物群的稀有品種之一，目前發現的標本少於二十塊。 *Hallucigenia* had seven pairs of spines and seven pairs of legs and an ellipsoidal-shaped head. It was one of the rarest species found in the Chengjiang Biota. To date, less than twenty specimens have been discovered.
始萊得利基蟲 *Eoredlichia intermedia*	節肢動物三葉蟲的一種。節肢動物是地球上品種最多的動物，特徵是身體和腳都有關節和全身覆蓋著外骨骼。 A trilobite which belonged to the arthropod class. Arthropods constituted the largest group of animals on the Earth. They are characterized by their segmented body, jointed foot and exoskeleton.
長尾周小姐蟲 *Misszhouia longicaudata*	以研究澄江動物群專家周桂琴的姓氏來命名的軟殼節肢動物。 A soft-celled arthropod named after Ms G.Q. Zhou, an expert of the Chengjiang Biota.
原古杯 *Archaeocyathus sp.*	古杯動物生存於寒武紀的熱帶或亞熱帶水域，是建造生物岩礁的基本元素，由於單體外形類似杯狀，故有「古杯」一名。 *Archaeocyathids* lived in warm tropical and subtropical waters during the Cambrian period, were the basic elements for building bioherms. Each individual had the shape of a hollow vase.
筆石 Graptolite	筆石生存於寒武紀中期至石炭紀末期。牠的身體呈蠕蟲形，化石的形態好像用筆在岩石表面書寫的痕迹，因此有「筆石」之稱。 Graptolites lived between the middle Cambrian and the late Carboniferous. The fossils of their worm-like bodies looked akin to hieroglyphs written on the rock surface.
矽化木 Petrified wood	矽化木是一種樹木化石。當樹木埋藏地底後，流經的水份會將礦物質(例如石英)沉積在植物的細胞內，使樹木結構得以保存下來。 Petrified wood is a type of tree fossil. When the wood was buried under sediment, minerals (e.g. quartz) in flowing water deposited inside the cells of the wood. The wood was preserved and its structure remained intact.
鱘魚類 *Acipenseroidei*	鱘魚類出現於中生代，內骨骼全爲軟骨質，魚身幾乎無鱗片。由於現存鱘魚的魚子可製作魚子醬，因此牠們被過度捕捉而告瀕危。 *Acipenseroidei,* which occurred in Mesozoic, includes sturgeons and their relatives. Their endoskeletons were mainly made up of cartilaginous bones while their bodies had almost no scales. Existent sturgeons are endangered as they are caught in large quantities for caviar.
鳴螽 *Habrohagla curtivenata*	鳴螽是直翅目昆蟲，和草蜢是親戚。牠們後足發達，善於跳躍，喜歡棲息於灌木叢中，主要捕食其他昆蟲。 Belongs to the Orthoptera order, *Habrohagla curtivenata* was a relative of grasshopper. With hind legs that were well-developed, the insect was good at leaping. It lived in areas of vegetation and preyed on other insects.

中國雙脊龍 *Dilophosaurus sinensis*	早侏羅紀的肉食性恐龍，名字來自頭上的兩片大大的骨冠。雙脊龍與後來的大型肉食性恐龍相比，身體比較輕巧靈活。 *Dilophosaurus sinensis,* which lived during the Early Jurassic, is best known for the two bony crests on its head. This carnivorous dinosaur was slimmer and more dexterous than its giant successors.
上游永川龍 *Yangchuanosaurus shangyouensis*	生活於晚侏羅紀的肉食性恐龍，頭骨兩側有多對大孔，藏有用以撕咬的强壯 肌肉。 A carnivorous dinosaur lived during Late Jurassic. It had several openings on the upper skull for attachment of powerful biting muscles.
華美金鳳鳥 *Jinfengopteryx elegans*	金鳳鳥與著名的始祖鳥處於同一演化水平，但金鳳鳥牙齒較多，前肢顯著短於後肢，顯示出它比始祖鳥略爲原始。牠是迄今所發現最原始的初鳥類。 *Jinfengopteryx* was on the same evolution level as the famous *Archaeopteryx*. However, *Jinfengopteryx* had more teeth and its fore limbs were evidently shorter than its hind limbs. It means that *Jinfengopteryx* was slightly more primitive. It is the most primitive avialian bird discovered so far.
原始中華龍鳥 *Sinosauropteryx prima*	中華龍鳥是世界上最早被發現的帶羽毛恐龍，身上和尾巴都披滿了絲狀的原始羽毛，但它前肢短小、尾巴極長，因此不會飛行，只能在地上奔跑。 *Sinosauropteryx prima* was the first known feathered dinosaur worldwide. Its body and tail were covered with filamentous, prototypical feathers. However, it could not fly but run on the ground because of its short fore limbs and extremely long tail.
聖賢孔子鳥 *Confuciusornis sanctus*	孔子鳥是已知最早能夠飛行的鳥類，牠和現代鳥類一樣擁有角質喙，沒有牙 齒。雄鳥尾部還有一對很長的尾羽。 *Confuciusornis sanctus* was the earliest known flying bird. Like modern birds, it had a toothless, horny beak. Males also possessed a pair of long tail feathers.
千禧中國鳥龍 *Sinornithosaurus millenii*	中國鳥龍長1米多，身體已經具備了類似鳥類的羽毛，而且肩部結構容許前肢做出拍打的動作。 *Sinornithosaurus millenii* was about one metre long and covered with feather-like structures. Its pectoral girdle enabled flapping actions of the fore limbs.
顧氏小盜龍 *Microraptor gui*	前後肢具有能用於飛行的不對稱羽毛。牠能於樹間滑翔，但不能從地面振翅 高飛。 Asymmetrical feathers suitable for flight were found at the fore and hind limbs of *Microraptor gui*, indicates that it glided between trees but could not take off from the ground.
查干諾爾龍 *Nuoerosaurus chaganensis*	查干諾爾龍身長26米，是在中國北部出土最大的恐龍之一。牠們聚居於白堊紀早期的內蒙古浩瀚草原。 Measuring 26 meters long, *Nuoerosaurus chaganensis* is one of the largest dinosaurs unearthed in northern China. Flocks of them lived in the vast Mongolian plain during early Cretaceous.

遼寧古果 *Archaefructus liaoningensis*	生長於白堊紀早期，是古果屬之一，並且是已知最早的開花植物之一。 *Archaefructus liaoningensis* retrospected to the Early Cretaceous Period, and is now recognized as one of the earliest flowering plant on Earth.
中華古果 *Archaefructus sinensis*	繼遼寧古果之後又一發現，古果屬這一個被子植物類群因而建立，是研究開花植物的起源和演化的重大突破。 Discovered after *Archaefructus liaoningensis*. A new genus *Archaefructus* was thus established for these two species, representing a giant breakthrough in research into the origin and evolution of flowering plants.
攀援始祖獸 *Eomaia scansoria*	生活於白堊紀早期，是迄今所發現的最古老的有胎盤類哺乳動物 。 Lived during the early Cretaceous, *Eomaia scansoria* is the oldest known mammal with a placenta.
禽龍 *Iguanodon*	禽龍是生於中侏羅紀至晚白堊紀的植食性恐龍 。人類最早發現的恐龍就是禽 龍，因此對牠們亦所知最多。 *Iguanodons* were herbivorous dinosaurs that lived from the Middle Jurassic to the Late Cretaceous. One of the first dinosaur species to be found, they are among the best known of all dinosaurs.
蒙古鸚鵡嘴龍 *Psittacosaurus mongoliensis*	鸚鵡嘴龍生活於白堊紀早期，比原角龍早出現，是中亞地區常見的植食性 恐龍。由於已發現多件成體和幼體的化石，人們對牠的生活史較爲認識。 Occurred earlier than *Protoceratops*, *Psittacosaurus* was a common genus of herbivorous dinosaurs in middle Asia during the Early Cretaceous. Since fossils of juvenile and adult have been collected, it is one of the best known dinosaur genera.
巴克龍 *Bactrosaurus sp.*	蒙古高原特有的鴨嘴龍類，生活於白堊紀晚期。雖然牠不像哺乳動物一樣擁有臼齒，但牠口中有數以千計的細齒，用以研磨多纖維的植物。 A duck-billed dinosaur native in Mongolia in the Late Cretaceous. Although it lacked molars like mammals, its mouth contained thousands of teeth suitable for grinding plants.
原角龍 *Protoceratops sp.*	著名的三角龍的親戚，但頭上沒有角。聚居於白堊紀晚期的內蒙古 。 They were relatives of famous *Triceratops* without horns. Herds of them lived in Inner Mongolia during Late Cretaceous.
二連鹽池恐龍化石 Erlianyanchi Dinosaurs Fossil	十條呈自然原生狀態的晚白堊紀肉食和素食恐龍相互交疊在一起 ，也許紀錄了恐龍滅絕時的情景。 Ten complete dinosaur skeleton fossils of both meat-eating and plant-eating dinosaurs, while still intact in their natural biological condition, were found overlapping one another. It might be a snapshot of dinosaur extinction in the Late Cretaceous Period.

似劍齒虎 *Homotherium*	似劍齒虎的化石在北美洲、歐洲及亞洲都有發現。和其他劍齒動物相比，牠們的牙呈彎刀狀，有鋸齒邊緣，但較爲扁平及短小。 *Homotherium* fossils have been found in North America, Europe and Asia. They distinguished from other saber-toothed cats by its serrated scimitar teeth, which were comparatively shorter and flattened.
三趾馬 *Hipparion sp.*	被視爲現代的馬的近祖，體型比現代的馬小，每腳均有三趾，中趾粗而著地，側趾較小並且開始退化，逐漸形成現今的馬蹄。 *Hipparion* are believed to be the nearest ancestor of modern horses. They had a smaller build, and each foot was three-toed. Only the central toe was brawny and in contact with the ground, while the outer toes on either side were small and had started degenerating into the modern hooves.
松花江猛獁象 *Mammuthus sungari*	猛獁象生存在10萬至1萬年前。特徵在於身上的長毛和一對長而捲曲的象牙。牠們滅絕的原因，可能與冰河期的氣溫劇變有關。 *Mammuthus sungari* lived about ten to one hundred thousand years ago. They had remarkably long hair and a pair of long, curved tusks. One of the reasons for their extintion might be the rapid change of temperature during the ice age.
大唇犀 *Chilotherium sp.*	大唇犀下頜粗壯並擴大成鏟狀，頭骨短而無角。牠生活在沼澤地帶，以水中的植物爲食。 *Chilotherium* was a herbivore. Its lower jaw was thick and strong, and appeared in the shape of a spade. The skull was short and hornless. It lived in marshlands and fed on water plants.
大熊貓 *Ailuropoda melanoleuca* (The Gaint Panda)	在約10萬年前的更新世，大熊貓的活動範圍不只局限於四川秦嶺以南，秦嶺以北的中原地區也有牠的身影。 During the Late Pleistocene of around 100,000 years ago, giant pandas had roamed over a much wider area than it current habitant in the southern part of the Qinling Mountains in Sichuan.

教學重點 **Keypoints**

澄江生物群 Chengjiang Biota 雲南澄江生物群完整地保存了寒武紀多種早期多細胞生物的化石，包括極難石化的 軟體動物，以及最早的脊椎動物，是研究寒武紀生物大爆發的重要根據。

Chengjiang Biota in Yunnan perfectly preserved many species of multi-celled organisms in Cambrian Period, including soft-bodied organisms which were hardly fossilized, and the earliest vertebrates. It provides an essential clue to Cambrian Explosion.

熱河生物群 Jehol Biota 熱河生物群包含侏羅紀晚期至白堊紀早期的多種生物 。較具代表性的化石包括擁有 羽毛的恐龍、有胎盤的始祖獸、古鳥類和早期被子植物等 ，對這些生物的起源和當 時的生態提供非常重要的樣本。

Jehol Biota contains the fossils of diversified organisms from late Jurassic to early Cretaceous such as feathered dinosaurs, earliest placental mammal, ancient birds and early angiosperms, etc. The fossils are of significant importance to understanding the origins of these organisms and the ecology then.

中國恐龍化石 Chinese dinosaurs fossils 中國已記載的恐龍屬種有140多種，約佔全世界的六分之一。中國所發現的恐龍蛋化 石，無論在數量、保存的質量和種屬，都是世界第一。

More than 140 genera of Chinese dinosaurs have been identified. It corresponds to about one-sixth of genera found worldwide. China also keeps the record of finding the most of dinosaurs eggs, in terms of number, quality and genera.

香港出土的化石 Fossils discovered in Hong Kong 香港已知最早的地層約有四億年歷史(泥盆紀)。香港主要發現有化石的地點包括： 東平洲、吉澳、黃竹角咀、馬屎洲、泥涌、荔枝莊、元朗及大嶼山等多個地點。香 港曾發現的化石有盾皮魚類、菊石、珊瑚、海百合、有殼軟體動物、各類植物以及 昆蟲等。

The earliest known stratum in Hong Kong is about 400 million years old (Devonian Period). Major fossils spots include Tung Ping Chau, Kat O, Wong Chuk Kok Tsui, Ma Shi Chau. Nai Chung, Lai Chi Chong, Yuen Long and various spots in Lantau Island. Fossils of placodermi, ammonoids, corals, crinoids, shelled molluscs, various plants and insects have been discovered in Hong Kong.

網上資源 **Online Resources**

1. BBC Prehistoric Life
   http://www.bbc.co.uk/sn/prehistoric_life/
2. Dino Dictionary
   http://www.dinodictionary.com/index.asp
3. Dinomorph
   http://www.cs.uoregon.edu/~kent/DinoMorph.htm
4. Paleonotology
   http://ology.amnh.org/paleontology/
5. Online course about history of life
   http://rainbow.ldeo.columbia.edu/courses/v1001/dinodis3.html
6. 中國科學院南京地質古生物研究所
   http://www.nigpas.ac.cn/museum/museum.htm
7. 古花傳奇
   http://web2.nmns.edu.tw/flower/c/c01_01.php
8. 古海洋生物檢索
   http://activity.nmmba.gov.tw/wordwaters/nohinder/elibrary.htm
9. 鳥類起源與演化知識百問百答
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