

小「有孔蟲」，大不同

Tiny Foraminifera, Big Differences

現存約 8900 種，生活在不同棲地環境中。特別的是，不同的氣候條件與環境（水深、底質、溫度、鹽度等）會有特定的生存種類，且因為有孔蟲的殼體容易保存形成化石，因此是非常適合用來研究過去氣候與環境變化的指標生物。

There are approximately 8,900 extant species of foraminifera, living in various habitats. Notably, specific species thrive under particular climate conditions and environmental factors (such as water depth, sea floor substrate, temperature, and salinity). Because their shells are well-preserved and fossilize easily, foraminifera serve as an excellent indicator for studying past climate and environmental changes.

依棲息環境的不同，有孔蟲的生態類型可以分為兩大類。

1. 浮游性：
懸浮於海水之中的「浮游型」
2. 底棲性：
海床表面的「表棲型」
沉積物裡的「裡棲型」

Foraminifera can be classified into two major groups based on their life cycle:

1. Planktonic:
Float within seawater (planktonic type)
2. Benthic
Live on the sea floor surface (epifaunal type)
Burrow within sediments (infaunal type)

1. 有機質

異網足蟲亞目

說明：殼壁為分泌有機物假幾丁質構成的柔軟薄膜，可黏附沉積物顆粒

Organic Material

Suborder Allogromiida

Description: The shell wall is a soft, thin membrane made of secreted organic material resembling pseudochitin, which can adhere to sediment particles.

2. 膠結質

編織蟲亞目

說明：殼壁為各種外在物質，如：遺骸分泌之有機物質膠結而成。

Agglutination Material

Suborder Textulariida

Description: The shell wall is formed by the agglutination of various external materials, such as organic substances secreted from debris.

3. 石灰質 (微粒型)

紡錘蟲亞目

說明：殼壁由極細小的方解石顆粒組成，方解石顆粒常有再結晶現象。

Calcareous (microgranular)

Order Fusulinida

Description: The shell wall is composed of extremely fine calcite grains, often showing signs of recrystallization.

4. 石灰質 (陶瓷型)

栗蟲亞目

說明：殼壁由細針狀高鎂方解石與有機質黏合而成，狀似陶瓷。

Calcareous (porcelaneous)

Order Miliolid

Description: The shell wall is formed by fine needle-shaped high-magnesium calcite, bound together with organic materials, giving it a ceramic-like appearance.

5. 石灰質 (透明型)

車輪蟲亞目、抱球蟲亞目

螺紋蟲亞目、羅伯蟲亞目

瓶型蟲亞目、包旋蟲亞目

說明：殼壁由低至高鎂方解石排列而成，基本呈透明但也有因成分、厚度等因素呈不透明者。

Calcareous (hyaline)

Order Rotaliida、Order Globigerinida

Order Spirillinida、Order Robertinida

Order Lagenida、Order Involutinida

Description: The shell walls are arranged from low to high magnesium calcite, typically transparent, but may appear opaque due to variations in composition or thickness.

淡水 <-> 海水

Freshwater <-> Seawater

有孔蟲失蹤謎團 ??

The Mystery of the Missing Foraminifera??

有孔蟲鎮發生了一些神秘的事件

事件一

請觀察封鎖線內圓盒裡的有孔蟲型態，以及它的棲息地，推測出此區域之前是否有重大事件，請指出線索。

Some mysterious events have occurred in Foraminifera Town...

Event 1:

Observe the foraminifera shapes within the circular containers behind the tape, along with their habitats. Can you deduce whether a major event occurred in this area? Point out the clues.

事件二

有孔蟲被不明份子綁架了！下方為他們最後在家門口的影像，請觀察圓盒裡的有孔蟲型態及比例，將他們放回正確的棲息地。

Event 2:

The foraminifera have been kidnapped by unknown individuals! Below is the last image captured of them at their doorstep. Examine the shapes and proportions of the foraminifera in the circular containers and return them to their correct habitats.

Step1.

請以放大鏡在標本片上尋找有孔蟲的身影。

Use the magnifying glass to locate the foraminifera on the specimen slides.

Step2.

圖面上的標示點為有孔蟲，觀察有孔蟲的世界吧！

The marked points on the image indicate foraminifera. Observe and explore the world of foraminifera!

Step3.

體驗看看有孔蟲的觸感吧！

Experience the Texture of Foraminifera!

「有孔蟲」知多少

有孔蟲種類眾多，微小卻也複雜，令人不禁讚嘆大自然的微妙！

How Much Do You Know About Foraminifera?

Foraminifera, though small, are highly diverse and complex, showcasing the wonders of nature!

大小：

由宛如沙粒的星沙，到大如錢幣的貨幣蟲

Size:

Ranging from tiny sand-like particles, such as star sand, to larger species like coin-sized Nummulites.

殼體組成：

碳酸鈣質 (有陶瓷型、透明型、微粒型三種)、膠結質、有機質。

Shell Composition:

Calcium carbonate (three forms: microgranular, porcelaneous, and hyaline), agglutinated material, organic material

外觀：

為了適應棲地環境，演化出許許多多不同的外觀

Appearance:

Evolved into diverse forms to adapt to their habitats.

偽足：絲狀細胞質，可進行攝食、呼吸、排泄、助產、附著、移動、造殼..等生理作用。

Pseudopodia: These thread-like extensions of the cytoplasm are used for feeding, respiration, excretion, reproduction, attachment, movement, and shell-building.

單細胞生物：本體宛如變形蟲般的細胞，會分泌或黏附出外骨骼。

Single-celled Organism: The body, much like an amoeba, secretes or adheres to an exoskeleton.

孔洞：外骨骼的殼體上帶有很多微小的孔洞，讓絲狀細胞質伸出殼體。

Pores: The shell (exoskeleton) is covered with tiny pores, allowing the thread-like cytoplasm to extend outside the shell.

謎團揭曉

事件一

有孔蟲也可用來追蹤過去地質災害的蛛絲馬跡。地震、颱風等地質災害造成的海底山崩、濁流發生時，會將淺海區域的沉積物及只生活在淺水環境的有孔蟲種類帶到深海環境保存形成化石。而海嘯則正好相反，有機會將生活在深水區域的有孔蟲種類帶到淺水區域而和淺海的種類混在一起。

推測看看，目前位置
的海域有可能發生
過什麼重大事件呢？



陸棚

推測看看，目前位置
的海域有可能發生
過什麼重大事件呢？



陸坡

推測看看，目前位置
的海域有可能發生
過什麼重大事件呢？



深海

事件二



浮游型



陸棚、坡



深海

| 指導單位 |



教育部
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雙語政策
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| 主辦單位 |



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