

生物多樣性展廳

Biodiversity Gallery

中學程度
Secondary Level

趣味習作
Activity Sheet

教師指南
Teachers' Guide



本地生物多樣性 Local Biodiversity

1. 捕魚攻略 Catch a Fish

過度捕撈可改變生態系統的結構，我們應避免進食以不可持續方式捕獲的海鮮。我們應避免食用以下哪些魚類？

Overfishing can lead to a shift in the ecosystem. Some seafood come from unsustainable fisheries and we should avoid consuming them. Which of the following fishes should we avoid consuming?

A

黃腳鯧
Yellowfin Seabream



B

細鱗
Painted Sweetlip



C

紅衫
Golden Threadfin Bream



D

老鼠斑
Humpback Grouper



E

火點
Russell's Snapper



避免食用.....
Avoid consuming.....

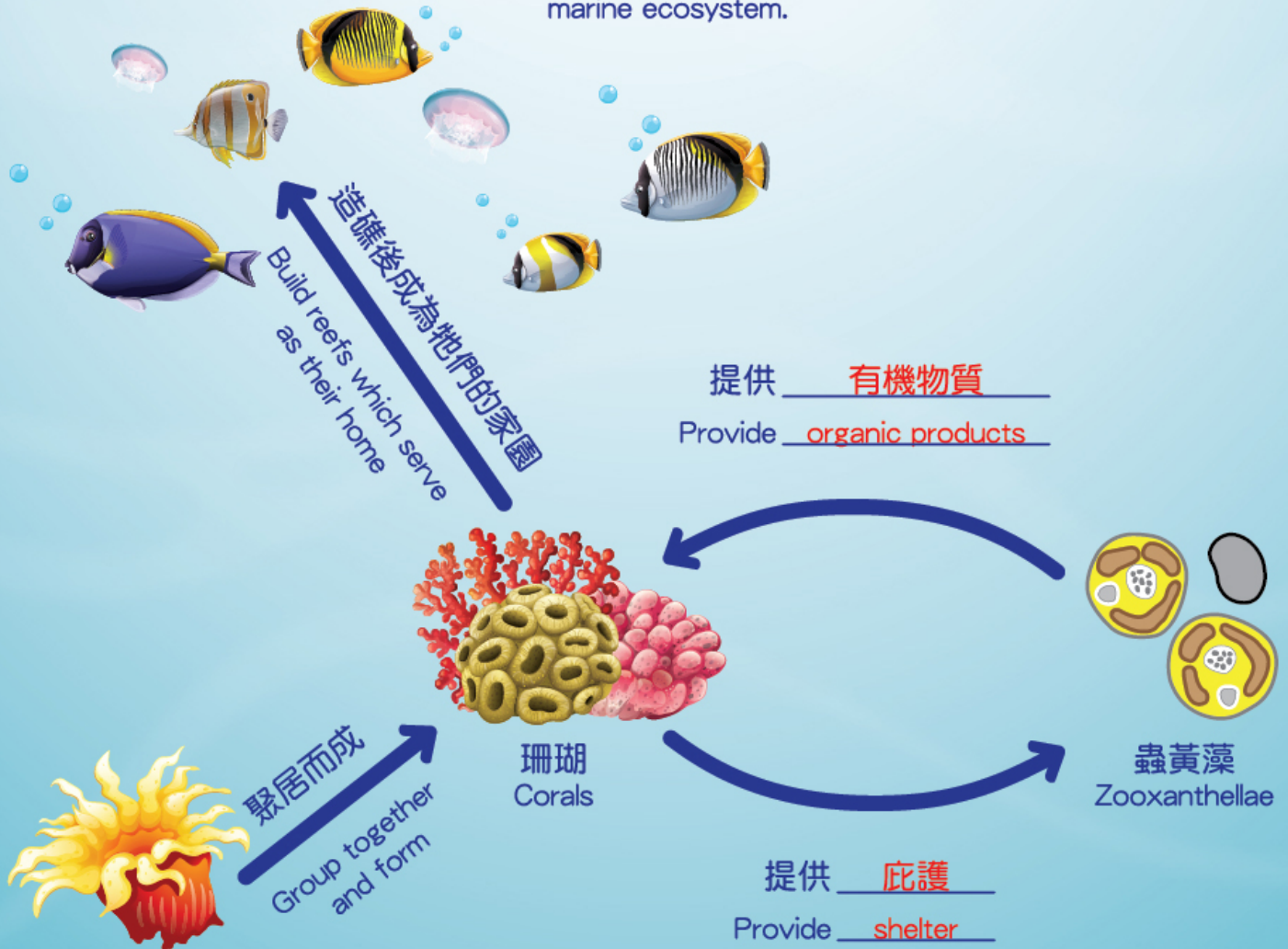
C, D

本地生物多樣性 Local Biodiversity

2. 海洋生境 Marine Habitat

珊瑚礁是地球上最多樣化和最寶貴的海洋生態系統之一，亦為不少海洋動植物提供居所。試完成以下關係圖以了解珊瑚對海洋生態的重要性。

Coral reef is one of the most diverse and valuable marine ecosystems on Earth. They are home to many marine animals and plants. Complete the relationship chart below to know more about the importance of coral reefs to the marine ecosystem.



珊瑚蟲
Coral polyps

大部分珊瑚都與蟲黃藻有 共生關係。
Most corals have a symbiotic relationship with zooxanthellae.

試想想.....
香港哪裏可以找到珊瑚群落?
Try to think.....
Where can we find coral communities in Hong Kong?

本地生物多樣性 Local Biodiversity

3. 中華白海豚 Chinese White Dolphin

印度太平洋駝背豚（中華白海豚）棲息於珠江口和香港水域一帶。請了解海豚的身體結構及其功能並完成以下描述。

The Indo-Pacific Humpback Dolphins (Chinese White Dolphins) inhabit Pearl River estuaries and Hong Kong waters. Let's understand their body structures and functions, and complete the descriptions below.

海豚身上呈現的 粉紅色，並不是皮膚下的紅色素所致，而是表皮下的 血液 流動造成，有助調節 體溫。

The pink body colour is a result of blood flowing to the body surface as part of the thermoregulatory function, rather than red pigments in the skin.

背鰭：猶如船的龍骨，讓海豚保持 直立，形狀及後緣形態有助於辨認 品種。

Dorsal fin: It resembles a ship's keel and keeps the dolphin upright. The shape and the notch pattern on its trailing edge are helpful in identifying the species.

胸鰭：唯一帶有 骨骼 的海豚鰭，有 平衡 作用，協助海豚停止和轉向。

Pectoral fin: It is the only dolphin fin which contains bones. This type of fins acts as balancing planes and help the dolphins stop and turn.

尾鰭：有助於在水中 推進。

Flukes: They facilitate propulsion through the water.



本地生物多樣性 Local Biodiversity

4. 紅樹林 Mangroves

香港大約有六十處紅樹林，分佈於西貢、新界東北、吐露港、后海灣、大嶼山及香港島。一同走進紅樹林來了解這特別的生境。

There are around sixty mangrove stands distributed throughout Sai Kung, the Northeast New Territories, Tolo Harbour, Deep Bay, Lantau Island and Hong Kong Island. Let's get into the mangroves and know more about this special habitat.



退潮 時，招潮蟹會在紅樹林泥灘上活動。

Fiddler crabs move around the mudflats of the mangroves during low tide.



彈塗魚是 水、陸 兩棲魚類，眼睛凸出。牠們可借助 尾部 在泥灘上彈跳，並利用強壯的 胸鰭 在陸地上爬行。

Mudskipper is a fish which can live in water and on land. It has protruding eyes and can leap on the surface of the mudflat with its tail. It also has strong pectoral fins for support and for crawling on land.



木欖的樹汁含有稱為 丹寧 的化學物質，可用來製作 紅色染料，是「紅樹」這名稱的其中一個由來。

The plant sap of *Bruguiera gymnorhiza* contains a chemical called tannin which can be used as red dye. This is one of the reasons why mangroves are known as "red trees" in Chinese.

秋茄樹 乃香港最常見的紅樹品種之一，下圖是一種典型的紅樹。

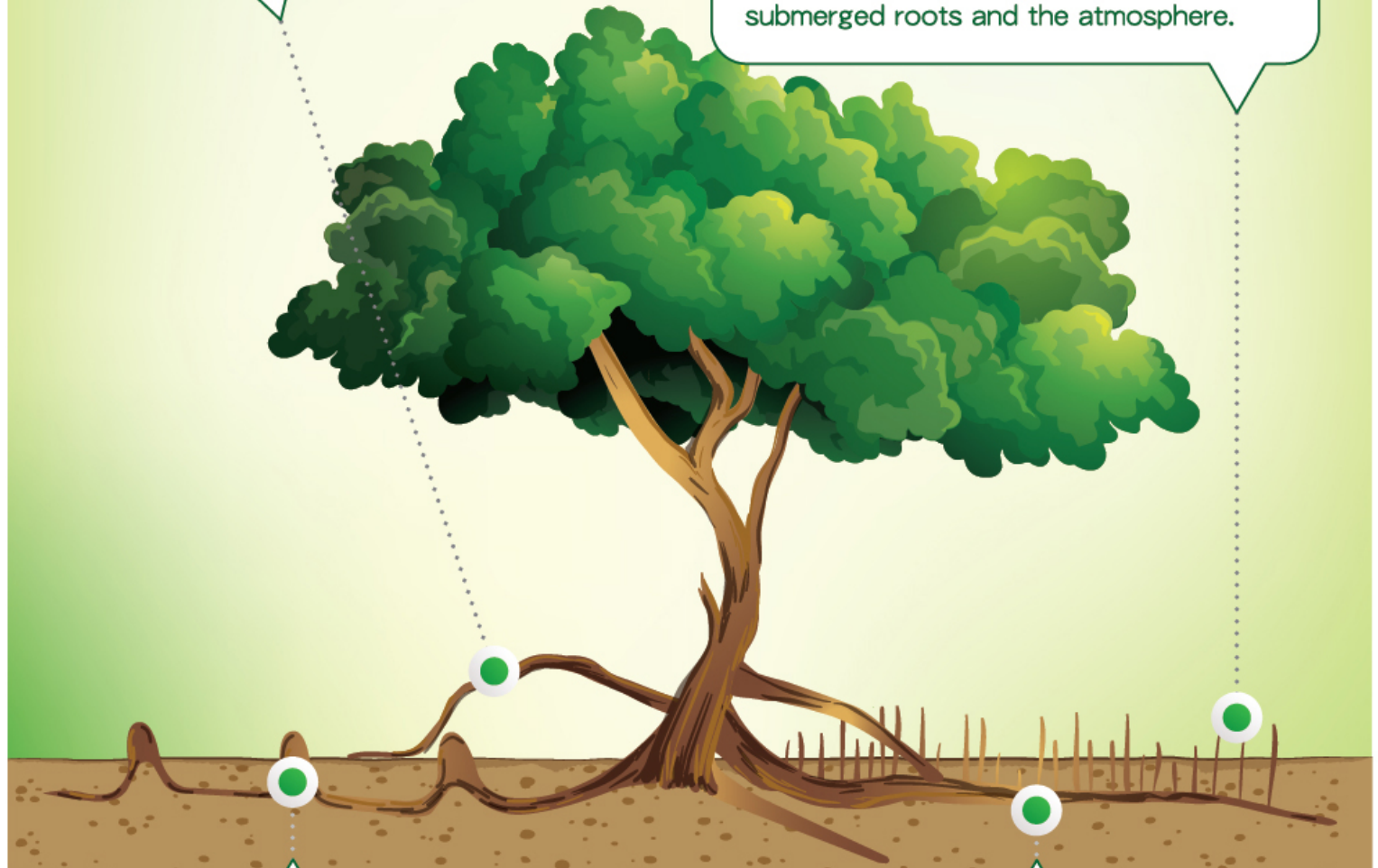
Kandelia obovata is one of the most common mangrove species in Hong Kong. The picture below is a typical mangrove tree.

一些紅樹的樹幹分支出支柱根，透過擴闊樹基提高 穩定性。

Some mangrove plants have branched, looping roots to provide stability by broadening the base.

為應對漲潮時的 缺氧 環境，從纜狀根長出的直立 氣根，可促進浸於水中的根部與大氣進行 氣體交換。

To cope with anaerobic conditions during high tides, there are erect aerial roots rising from the cable roots to facilitate gaseous exchange between the submerged roots and the atmosphere.



彎曲、突出泥面的 膝狀根 亦可增加氣體的運送。

Knee joints, in the form of roots which bend up like an arch and grow above the soil surface, also enhance the transportation of gases.

泥土中橫向伸展的 纜狀根，亦有助抓緊泥土以固定 位置。

Cable roots which spread horizontally in the soil also help secure the positions of the plants.

世界生物多樣性 Variety in the World

1. 適者生存 Animal Survival

不同棲息地的生物具有不同的適應特點，一同環遊地球來認識以下各種動物吧。

Organisms from different habitats possess different adaptations. Let's travel around the world and study the following animals.



北極熊 棲息於北極苔原，一般都是獨自生活，並以 海豹 為食物，人類是牠們生存的威脅。

Polar bears inhabit Arctic tundras. They are generally solitary. For their food source, they subsist on seals. However, humans pose a threat to their survival.

亞洲象 棲息於熱帶雨林，其族群結構以雌性作領導的家庭為基礎，牠們每天可進食高達150公斤的 植物，人類是牠們生存的威脅。

Asian elephants inhabit tropical rainforests. Their social structure is generally on family basis with female leaders. They can consume up to 150 kg of plants per day, and humans pose a threat to their survival.



蘇門答臘猩猩 棲息於熱帶雨林，一般都是獨自生活，以水果和葉子為食物，蘇門答臘虎 是牠們的天敵。

Sumatran orangutans inhabit tropical rainforests. They are generally solitary. They subsist on fruits and leaves. The Sumatran tigers pose a threat to their survival.



獵豹 棲息於稀樹草原，一般都是獨自生活，捕獵細小的有蹄類動物為食物，獅子 是牠們的天敵。

Cheetahs inhabit savannas. They are generally solitary. Usually, they prey on small ungulates. At present, they are under the threat of lions.



皇帝企鵝 棲息於南極冰地，通常都是聚居，主要食魚類、魷魚和甲殼類動物，豹海豹 是牠們的天敵。

Emperor penguins inhabit Antarctic ice and they live together in colonies. They feed on fish, squid and crustaceans. They are under the threat of leopard seals.

世界生物多樣性 Variety in the World

2. 亞馬遜雨林 Amazon rainforest

請走進森林小徑，考察亞馬遜雨林並回答以下問題。
Please walk through the Forest Trail, investigate the Amazon rainforest and answer the following questions.

1. 亞馬遜雨林是世界上_____的熱帶雨林。
The Amazon rainforest is the _____ tropical rainforest in the world.
A. 最小 smallest B. 最大 largest C. 最熱 hottest D. 最冷 coldest
2. 亞馬遜河的主流連同眾多的支流全長共約_____公里，最後注入大西洋。
The main river and the tributaries of the Amazon River flow over a distance of about _____ km to the Atlantic.
A. 1,400 B. 1,600 C. 6,400 D. 14,000
3. 亞馬遜雨林的氣候是_____。
The climate in the Amazon rainforest is _____.
 A. 溫暖及潮濕 warm and humid B. 寒冷及乾燥 cold and dry
C. 寒冷及潮濕 cold and humid D. 溫暖及乾燥 warm and dry
4. 亞馬遜雨林的四季氣候變化並不分明，大致上分為_____。
In the Amazon rainforest, there are no obvious seasonal changes, but seasons are basically divided into _____.
A. 春季及秋季 spring and autumn B. 雨季及旱季 rainy and dry seasons
C. 夏季及雨季 summer and rainy seasons D. 夏季及冬季 summer and winter
5. 地球上大約_____的已知物種皆存活於亞馬遜雨林。
There is an estimated _____ of known species on Earth inhabiting the Amazon rainforest.
A. 100% B. 50% C. 20% D. 10%
6. 亞馬遜雨林中的植物透過光合作用不斷將二氧化碳轉化成氧氣，素有_____之稱。
Because the vegetation of the Amazon rainforest continuously recycles carbon dioxide into oxygen through photosynthesis, it has been described as the _____.
 A. 「地球之肺」 "Lungs of the Earth" B. 「地球之心」 "Heart of the Earth"
C. 「地球之肝」 "Liver of the Earth" D. 「地球之腎」 "Kidneys of the Earth"
7. 森林砍伐已經導致約_____的雨林永遠消失。
_____ of the rainforest has been lost to deforestation.
 A. 五分之一 One fifth B. 十分之一 One tenth
C. 百分之一 One in a hundred D. 百萬分之一 One in a million

世界生物多樣性 Variety in the World

3. 非洲草原 African Savanna

來到非洲草原，導遊正在講解當地不同生物的習性。請完成以下筆記。

We have just arrived at the African Savanna and the tour guide is giving an introduction on the behaviours of different organisms. Please finish the notes below.



A. 金合歡的外型像 火箭 / 傘子，有二回羽狀複葉和尖刺。

Acacia usually has a distinct rocket / umbrella shape with bipinnate leaves and thorns.

B. 黃背草是多年生植物，能開出 扇狀 / 針形 花簇。

The red oat grass is a tufted perennial grass with a fan-like / pin-like inflorescence.

C. 長頸鹿頸上的椎骨數目與大部分哺乳類相同，但分別是牠們的比較 短 / 長。

The neck of a giraffe comprises the same number of vertebrae as most mammals, but those vertebrae are shortened / elongated.

D. 高角羚是一種中型羚羊，經常以 跳躍 / 爬行 方式走動。

The impala is a medium-sized antelope which often moves in leaps and bounds / by crawling.

E. 平原斑馬身上的條紋顏色是 黃與藍 / 黑與白。

The plains zebra's stripes are yellow and blue / black and white.

F. 紅嘴啄牛鳥的喙 尖而扁平 / 鈍而凹凸。

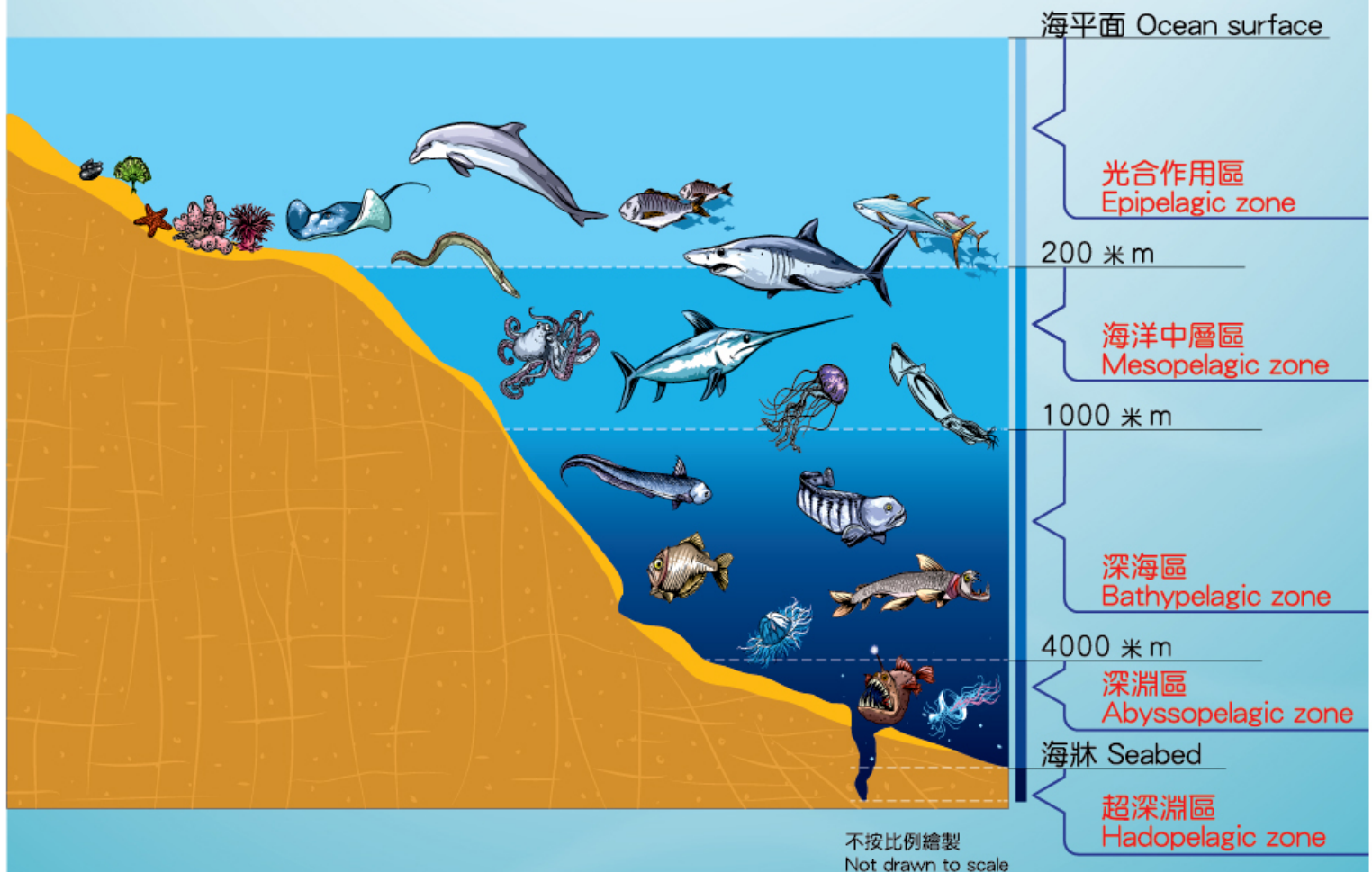
The red-billed oxpecker has a pointed and laterally compressed / blunted and rough bill.

世界生物多樣性 Variety in the World

4. 海洋潛航 Submarine Ride

地球的海洋是一個龐大的生態系統，在不同水深下可以發現不同的生物。請坐上「海洋潛航」的潛艇，認識不同水深區域的環境。

The Earth's ocean is a massive ecosystem. A variety of organisms can be found in different water depths. You are invited to dive together in the "Submarine Ride" and learn about the environment of different ocean zones.



這些區域的環境是怎樣的？生物如何適應每個區域獨特的環境？

How is the environment in these ocean zones? How do the organisms adapt to the unique environment in each zone?

時光變遷

Changes through Time

1. 生存策略

Survival Strategy

動物發展出擬態及偽裝的策略去增加牠們在大自然中生存的機會。擬態指將外型模擬成其他有毒或危險的物種；偽裝指將身體的顏色融入四周環境，使其他生物難以看見。以下動物在運用哪種策略？將字母填在適當的空格中。

Animals have developed the strategy of mimicry or camouflage to enhance their survival rate in the nature. Mimicry is the strategy of resembling other species which may be poisonous or dangerous. Camouflage refers to the strategy of blending the body colour into the surrounding environment, making it hard to be seen. Which strategy do the following animals use? Write the letters in the corresponding boxes.



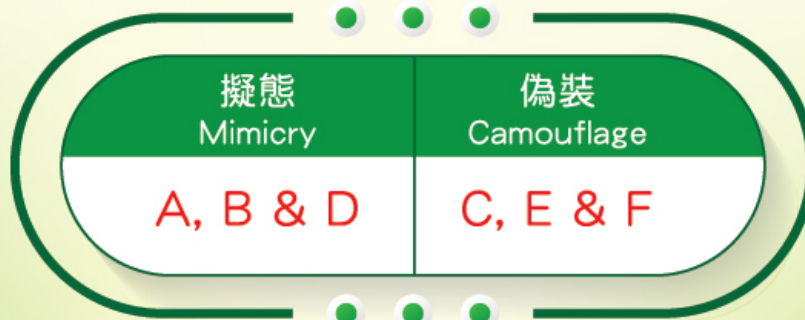
A.



B.



C.



D.



E.



F.



時光變遷

Changes through Time

2. 物種的滅絕

Extinction of Species

下列的物種最先出現在哪個年代？請將他/牠們與對應的年代配對。

Which period did the following species first appear? Match each species with the corresponding period.



甚麼原因導致以上物種滅絕？一起討論吧！

Why did the above species become extinct? Let's discuss.

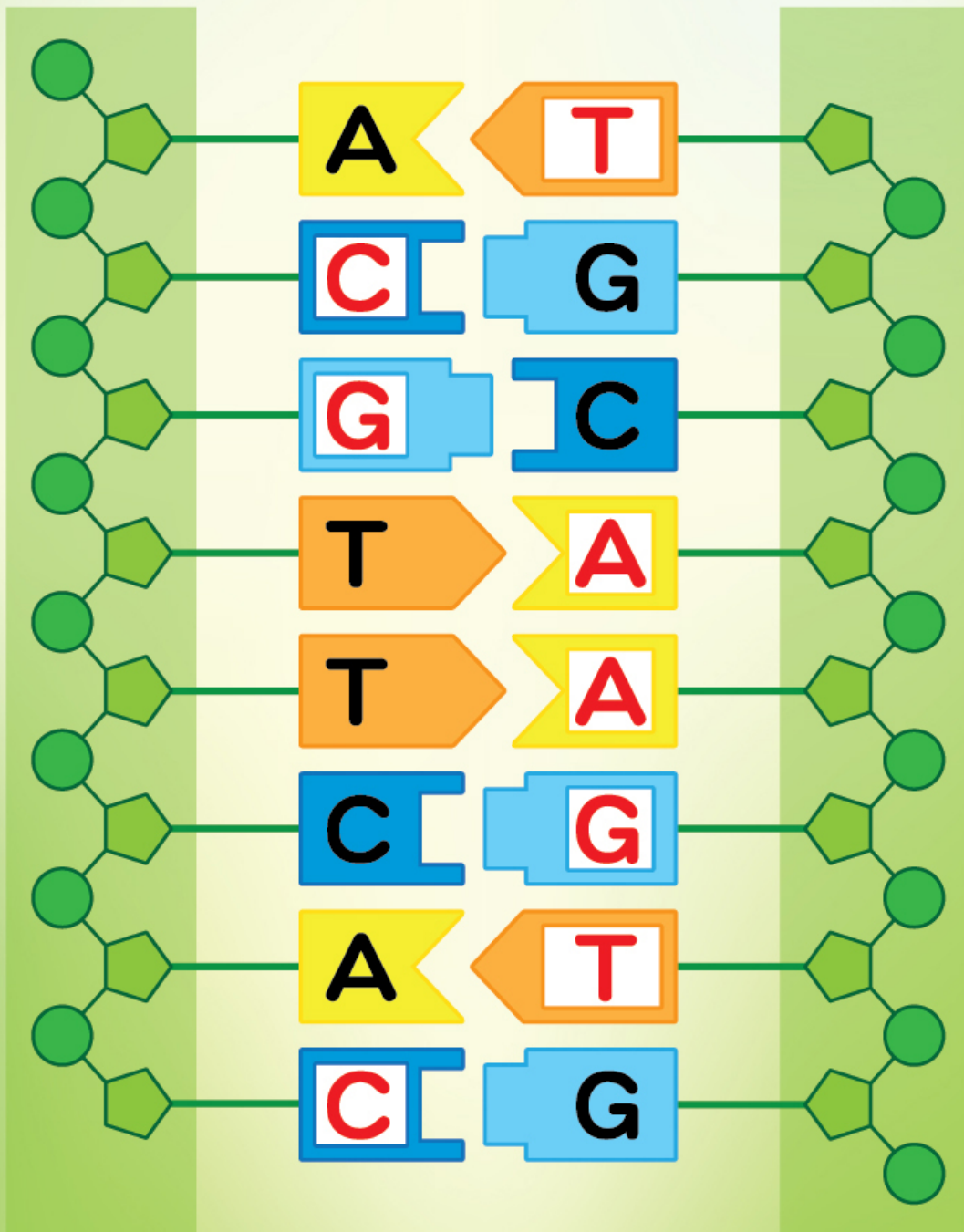
時光變遷

Changes through Time

3. DNA 配對 DNA Matching

脫氧核糖核酸(DNA)是由腺嘌呤(A)、胞嘧啶(C)、鳥嘌呤(G)及胸腺嘧啶(T)，四種核苷酸鹼基組合而成。試根據互補鹼基配對原則完成下圖。

Deoxyribonucleic acid (DNA) is a biopolymer made up of four kinds of nucleotide bases, namely adenine (A), cytosine (C), guanine (G) and thymine (T). Follow the principle of complementary base pairing and complete the diagram below.



自然實驗室 Nature Lab

1. 色素色與結構色 Pigmentary Colour and Structural Colour

大自然中的顏色主要由兩種方法產生 — 色素色和結構色。
以下生物或物體採用甚麼方法來產生顏色？

Pigmentary colour and structural colour are two major colour formation mechanisms in nature. What mechanism do the following creatures/objects use to produce colour?





B, C, F & G

色素色是一種由色素 / 納米結構 產生的化學 / 物理 顏色。

Pigmentary colour is chemical / physical in nature and produces colour by pigments / nanostructures.



A, D, E & H

結構色是一種由色素 / 納米結構 產生的化學 / 物理 顏色。

Structural colour is chemical / physical in nature and related to pigments / nanostructures.

你能夠在展覽中找出其他色素色和結構色的例子嗎？

Can you find other examples of pigmentary colour and structural colour from the exhibition?

自然實驗室 Nature Lab

2. 自製生態瓶 Homemade Biosphere

按照以下指示製作生態瓶。

Follow the instructions below to make your own biosphere.



材料

Materials

- 設防鏽蓋的可密封透明玻璃瓶
Sealable transparent glass jar with a rust-proof lid
- 鵝卵石
Pebbles
- 池塘淡水 (或加入藻類的淡水)
Fresh pond water (or freshwater with algae added)
- 有葉植物 (如金魚藻)
Leafy plants (e.g. hornwort)
- 小蝦或螺
Shrimps or snails
- 貝殼或其他水族裝飾
Seashells or other aquarium ornaments
- 撈網
Aquarium net
- 碳酸鈣粉 (非必需)
Calcium carbonate powder (optional)

實驗室中的技術員忘記了生態瓶製作步驟的次序，請幫助他以合理的邏輯順序排列好生態瓶的製作步驟。

The technician in the laboratory forgets about the order of the steps for making a biosphere. Please arrange the procedures in a logical order.

- A) 倒入池塘淡水至玻璃瓶一半的高度。
Fill half of the jar with pond water.
- B) 倒入池塘淡水至玻璃瓶的九成滿。
Fill the jar with pond water until 90 percent full.
- C) 固定有葉植物於石頭之間。
Anchor plants in rocks.
- D) 把鵝卵石鋪滿玻璃瓶的底部（約一吋厚）。
Put pebbles at the bottom of the jar (approx. 1 inch thick).
- E) 用撈網把已適應水溫的小蝦或螺移到玻璃瓶內。
Transfer the shrimps or snails which have acclimated to the water temperature into the jar with an aquarium net.
- F) 放置生態瓶於攝氏二十至二十五度並確保每天有十二至十六小時日照。
Place the biosphere at a consistent temperature of 20-25°C and with 12-16 daily hours of moderate light.
- G) 需要時可加入碳酸鈣粉作為酸鹼平衡。
Add calcium carbonate as a pH buffer if needed.

D > A > C > E > B > G > F

你知道加入生態瓶的物件和生物有甚麼功用？試用線將兩者連在一起。

Do you know the functions of the items and organisms you put in the biosphere? Draw lines to link them up.



池塘淡水
Fresh pond water

小蝦或螺
Shrimps or snails

有葉植物
Leafy plants

貝殼或其他海洋裝飾
Seashells or other
aquarium ornaments

鵝卵石
Pebbles

提供躲藏的空間
Providing shelter
for animals

含有碳酸鈣，
可以穩定酸鹼度
Containing calcium
carbonate which
helps stabilise pH

含有藻類供動物食用
Containing algae which
are food for animals

提供氧氣和食物
Providing oxygen
and food

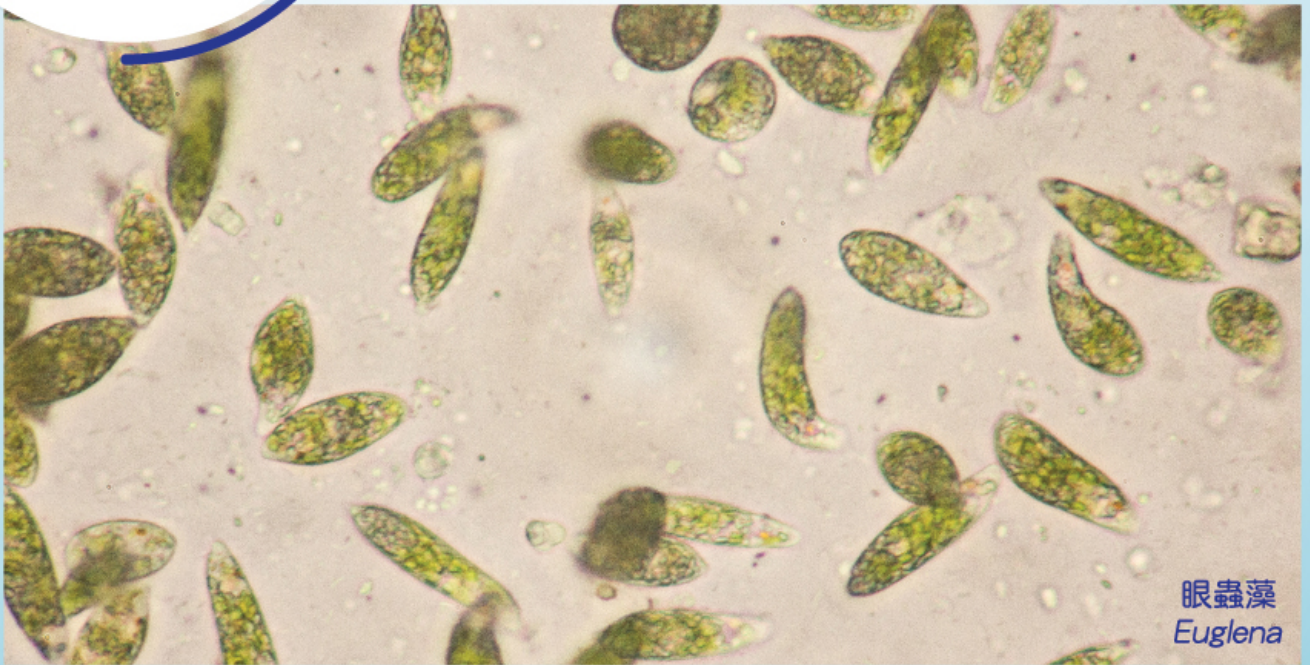
進食藻類和碎屑，
保持生態瓶清潔
Consuming algae and
other debris to keep
biosphere clean

自然實驗室 Nature Lab

3. 水中生命 Life in a Drop of Water

微生物也佔生物多樣性一重要席位，請借用實驗室的顯微鏡觀察牠們。

Microorganisms play an important role in biodiversity. Let's borrow the microscope in the laboratory and observe them.



A. 浮游植物 例如藻類是十分微細的植物，幾乎是所有水生食物鏈中的 基層。牠們能透過光合作用製造 食物，稱為 自養生物。

Phytoplankton are tiny plants such as algae which form the basis of nearly all aquatic food chains. They can make their own food through photosynthesis and are called autotrophs.

B. 浮游動物 是浮游生物的動物形態，例如 原生動物 和微型甲殼動物。種子蝦是海水及淡水環境中常見的一種微型甲殼動物，以 有機碎屑 作為主要食物。

Zooplankton are the animal form of plankton such as protozoa and small crustaceans. Seed Shrimps are very small crustaceans commonly found in marine and freshwater habitats. They mostly feed on organic particles.

C. 眼蟲藻具有植物及動物的特徵。牠們的 紅色眼點 對光較為敏感，有助於牠們朝着光線移動。當光線不足時，眼蟲藻則轉變成 異養生物，進食碎屑及其他微細的生物如變形蟲和 草履蟲 等吸取營養。

Euglena have features of both plants and animals. Their red eyespots are light-sensitive and aid them in moving towards light. When there is insufficient light, *Euglena* turn into heterotrophs and absorb nutrients by consuming food particles and other tiny organisms such as amoeba and paramecium.