



# 高中生物科野外考察課程 Senior Secondary Biology Field Study Course



## 小生境探奇 (可觀及其附近地方) Exploring microhabitats (Ho Koon & nearby area)

姓名 Name: \_\_\_\_\_ 組別 Group: \_\_\_\_\_ 日期 Date: \_\_\_\_\_

### 學習目標 Learning goals

完成課程後，學生應能： After the course, students should be able to:

1. 鞏固對營養循環的認知； Consolidate the knowledge of nutrient cycle;
2. 明白不同小生境的物理特質； Understand the physical characteristics of different microhabitats;
3. 掌握探索不同小生境的技巧； Acquire the skill in exploration of different microhabitats;
4. 辨別棲息於不同小生境的動物及認識其適應特徵； Identify the animals found in these microhabitats and learn their adaptation features;
5. 與他人合作進行考察和資料整理工作； Cooperate with others to do field investigation and data processing;
6. 製作簡單科學報告； Make simple scientific report;
7. 欣賞大自然之美和尊重生物。 Appreciate the wonder of nature and respect living things.

### 程序 Schedule

|               |  |
|---------------|--|
| 09:00 - 10:00 | 簡介 Briefing                                  |
| 10:00 - 12:00 | 考察工作 & 實驗室工作<br>Field work & laboratory work |
| 12:00 - 13:00 | 午膳 Lunch                                     |
| 13:00 - 14:30 | 考察工作 & 實驗室工作<br>Field work & laboratory work |
| 14:30 - 15:15 | 資料整理 Data processing                         |
| 15:15 - 16:15 | 分組匯報 Group presentation                      |
| 16:15 - 16:30 | 討論 & 總結<br>Discussion & summary              |

### 儀器及工具 Equipment and tools

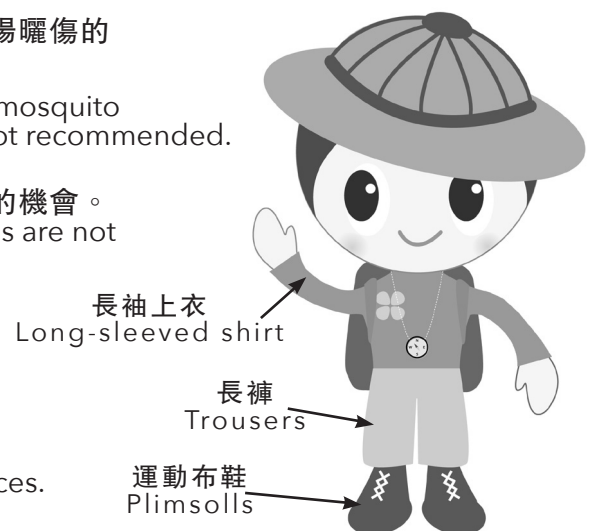
|   |   |
|---|---|
| 1 | 寫字夾板 Clipboard  |
| 2 | 平板電腦 / 數碼相機<br>Tablet computer / Digital camera                 |
| 3 | 圖鑑 Pictorial Guides   |
| 4 | 膠袋、小瓶、鉗子、滴管、鏟<br>Plastic bags, vials, forceps, droppers, shovel |
| 5 | 土壤溫度計、手套、收集器<br>Soil thermometer, gloves, collecting device     |
| 6 | 筷子、培養皿<br>Chopsticks, petri dishes                              |
| 7 | 數碼解剖顯微鏡<br>Digital dissecting microscope                        |
| 8 | 複式顯微鏡、玻片、蓋玻片<br>Compound microscope, slides, cover slips        |

### 衣著 Clothing

1. 穿著長袖上衣和長褲能更有效防止蚊蟲叮咬，亦可減低被太陽曬傷的機會，不應穿著短褲。  
Long-sleeved shirt and trousers for better protection against mosquito and insect bites, as well as preventing sunburn. Shorts are not recommended.
2. 不應穿著拖鞋或涼鞋，而應穿著運動布鞋，以減低腳部受傷的機會。  
A pair of plimsolls for preventing injuries. Slippers and sandals are not recommended.

### 安全 Safety

1. 避免踏足陡斜和濕滑的岩石和泥土表面。  
Avoid stepping on steep and wet rock surfaces and soil surfaces.
2. 切勿闖入植物生長茂密的地方，以免觸及蜂巢或被植物割傷。  
To prevent being attacked by wasps from disturbed wasp nests or being injured by plant leaves and thorns, do not get into places with dense vegetation.



## A. 檢視小生境的特質 Examine the characteristics of microhabitats

記錄你們將要檢視的兩個小生境的物理特質。

Record the physical characteristics of the two microhabitats that you would examine.

| 物理特質<br>Characteristics   | 陸地 Terrestrial<br>枯枝落葉 Leaf litter /<br>泥土 Soil | 水 Aquatic<br>生態池中藻類 Algae in the eco-pond /<br>生態池沉積物 Sediment in the eco-pond /<br>魚桶沉積物 Sediment in the fish bucket |
|---|---|---|
| 顏色<br>Colour  |   |   |
| 質地 (軟硬、乾濕等)<br>Texture<br>(soft/hard, dry/wet, etc.)                                |   |   |
| 組成物質<br>Composition   |   |   |
| 溫度<br>Temperature   |   |   |
| 小生境表面或附近的生物<br>Living organisms found at<br>the surface or near the<br>microhabitat |   |   |

## B. 收集小生境樣本 Collect the microhabitat sample

- 枯枝落葉：收集時，請迅速將枯枝落葉利用收集器撿取，並放進一個大膠箱內。  
Leaf litter: During the collection, use the tailor-made device to collect the litter as fast as possible. Then put them into the large plastic box.
- 泥土：利用大剷挖出約5厘米深的泥土，可以選擇近農地的土壤或在溝渠堆積的沙泥，收集約2-3千克的重量，並放進一個大膠箱內。  
Soil: Use a large spade to dig into the soil for about 10cm depth in places near to the farmland or in the ditch with accumulated sand. Collect about 2-3 kg in weight. Then put them into the large plastic box.
- 生態池中藻類：在水池旁的位置，尋找綠色或褐色浮於水中的絲狀水藻，利用鉗子和小瓶收集。  
Algae in the eco-pond: Search for the green or brown filamentous algae at the edge of the pond, collect them by using a pair of forceps and a small vial.
- 生態池沉積物：利用滴管和小瓶於生態池收集沉積物。  
Sediment in the eco-pond: Use a dropper and a small vial to collect the sediment.
- 魚桶沉積物：利用滴管和小瓶於魚桶收集沉積物。  
Sediment in the fish bucket: Use a dropper and a small vial to collect the sediment.



## A. 處理和詳細檢視樣本 Handle and examine samples in details

### 1. 枯枝落葉 / 泥土 :

在大膠箱內，利用工具仔細分散樣本，檢出當中的各樣生物，太細小的生物可放於數碼解剖顯微鏡中觀察。嘗試分類及估算各種的相對數量，並可拍下照片或影片。

Leaf litter / Soil:

In the plastic box, find out the organisms in the samples carefully with appropriate tools and collect them. If the organisms are too small, put them under dissecting microscope for observation. Try to identify and estimate their relative abundances of different species and even take photos or videos of them.

### 2. 生態池中藻類 / 生態池沉積物 / 魚桶沉積物 :

觀察水藻樣本 / 沉積物必須使用玻片和蓋玻片，可以製作多張玻片，然後在複式顯微鏡下觀察。嘗試辨認顯微鏡下觀察到的各種微生物，並在記錄表內記錄每種微生物我形狀、身體特徵、行為、移動方法等資料。

Algae in the eco-pond / Sediments in the eco-pond / Sediments in the fish bucket:

For the observation of algae / sediments, slide and coverslip must be used. A few slides have to be prepared and put under the compound microscope for detailed observation. Try to identify the microorganisms observed. Note the shape, physical characteristics, behaviour, locomotion and other features of each species in the record sheet.

## B. 小生境中的物種記錄 Organisms recorded in the microhabitats

陸地小生境 Terrestrial microhabitat : \_\_\_\_\_

|    | 生物名稱<br>Species Name | 個體數量*<br>No. of individuals | 營養模式^<br>Modes of nutrition | 外貌特徵#<br>Physical characteristics |
|----|----------------------|-----------------------------|-----------------------------|-----------------------------------|
| 1  |                      |                             |                             |                                   |
| 2  |                      |                             |                             |                                   |
| 3  |                      |                             |                             |                                   |
| 4  |                      |                             |                             |                                   |
| 5  |                      |                             |                             |                                   |
| 6  |                      |                             |                             |                                   |
| 7  |                      |                             |                             |                                   |
| 8  |                      |                             |                             |                                   |
| 9  |                      |                             |                             |                                   |
| 10 |                      |                             |                             |                                   |
| 11 |                      |                             |                             |                                   |
| 12 |                      |                             |                             |                                   |

\* 超過20以上的，可估算最接近的十位數；超過50以上，可估算為“>50”。

If over 20, estimate its number to the nearest ten. If over 50, estimate and record as “>50”.

^ A: 自養 Autotroph H: 植食 Herbivore C: 肉食 Carnivore O: 雜食 Omnivore D: 食腐植 Detritivore S: 食腐肉 Scavenger

# 外貌特徵：口器形狀、眼睛數量、眼睛大小、身體形狀、身體顏色或其他部分的特徵等等。

Physical characteristics: Shape of mouth part, number of eyes, size of eyes, body's shape, body's colour or other parts' characteristics, etc.

## B. 小生境中的物種記錄 Organisms recorded in the microhabitats

水生小生境 Aquatic microhabitat : \_\_\_\_\_

|    | 微生物名稱<br>Name of the<br>micro-organism | 形狀<br>Shape | 身體特徵<br>Physical<br>characteristic | 移動方法<br>Locomotion | 行為<br>Behaviour | 其他補充<br>Others |
|----|--|-------------|------------------------------------|--------------------|-----------------|----------------|
| 1  |  |             |                                    |                    |                 |                |
| 2  |  |             |                                    |                    |                 |                |
| 3  |  |             |                                    |                    |                 |                |
| 4  |  |             |                                    |                    |                 |                |
| 5  |  |             |                                    |                    |                 |                |
| 6  |  |             |                                    |                    |                 |                |
| 7  |  |             |                                    |                    |                 |                |
| 8  |  |             |                                    |                    |                 |                |
| 9  |  |             |                                    |                    |                 |                |
| 10 |  |             |                                    |                    |                 |                |

## C. 分析和討論 Analysis and Discussion

- 在你們研究的陸地小生境內，共找到多少種動物？哪一動物算是優勢種？哪類型（營養模式）的動物豐度相對較多？哪類型的動物豐度相對較少？  
According to the terrestrial microhabitat that you studied, how many animal species can be found? Which one is the dominant species? Which type (modes of nutrition) of animals is relatively richer in the microhabitat? Which type is relatively lesser in the microhabitat?
- 介紹其中兩種在你們研究的陸地小生境內所找的動物，描述牠們的外貌特徵與小生境特質的關係。  
Introduce 2 animals that found in the terrestrial microhabitat that you studied. Describe their external features in relation to their characteristics of that particular microhabitat.
- 試討論小生境中的優勢品種或其他物種的相對豐度，與牠們的進食模式有何等關係。  
Discuss the number of dominant species or other species in the terrestrial microhabitat that you studied, and any relationship with their diet.
- 在你們研究的水生小生境內，分別共找到多少種自養生物？多少種異養生物？  
According to the aquatic microhabitat that you studied, how many autotrophs and heterotrophs can be found respectively?
- 介紹其中兩種在你們研究的水生小生境內所找到的微生物的一些外貌或行為特徵。  
Introduce 2 microorganisms that found in the aquatic microhabitat that you studied. Describe their external features or other behavioural characteristics.