



# 實驗有關作業 - 野外生態考察 Practical Related Task- Ecology Field Work



## 小生境探奇 Exploring microhabitats

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. 鞏固對養分循環的認知 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

9:15 - 09:45	簡介 Briefing
09:45 - 12:00	考察 Field work
12:00 - 13:00	午膳 Lunch
13:00 - 14:00	實驗室工作 Laboratory work
14:00 - 15:00	資料整理 Data processing
15:00 - 16:15	分組匯報 Group presentation
16:15 - 16:30	討論及總結 Discussion & summary

### 儀器和工具 Equipment and tools

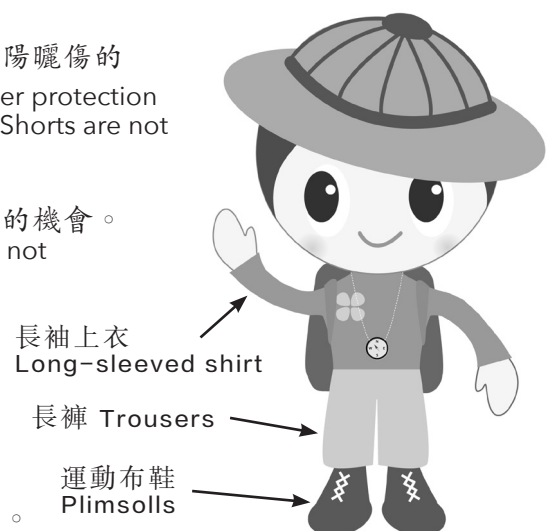
1	寫字夾板 Clipboard	
2	平板電腦/ 數碼相機 Tablet computer/Digital camera	
3	圖鑑 Pictorial Guides	
4	膠袋、小瓶、鉗子、滴管 Plastic bags, vials, forceps, droppers	
5	土壤溫度計、手套、收集器 Soil thermometer, gloves, collecting device	

### 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. 不同小生境的特質 Characteristics of different microhabitats

在考察地點，每組同學可以檢視不同的小生境如枯枝落葉、牛糞、泥土或水中藻類等，並嘗試記錄兩個小生的物理特質，以作比較。

At the field study site, each group may try to examine different microhabitats e.g. fallen leaves, cow dungs, soils or algae in water etc. Record the physical characteristics of two microhabitats for comparison.

特質 Characteristics	小生境 Microhabitat 1	小生境 Microhabitat 2
顏色 Colour		
質地 (軟硬、乾濕等) Texture (soft, hard, dry, wet etc.)		
組成物質 Composition		
溫度 Temperature		
小生境表面或附近的生物 Other living organisms found at the surface or near the micro-habitat		

## B. 收集小生境 (選兩種) Collect the microhabitat (Select two types)

### 1. 枯枝落葉 Litter

收集時，請迅速將枯枝落葉利用收集器撿取，並放進一個大膠袋內。

During the collection, use the tailor-made device to collect the litter as fast as possible. Then put them into the large plastic bag.

### 2. 牛糞 Cow dung

揀選一堆較大和完整的牛糞，利用大剷或膠袋，盡量完整地把全堆包好帶走。

Select a larger and complete cow dung, using the large spade or plastic bag to collect the whole patch of cow dung.

### 3. 泥土 Soil

利用大剷挖出約10厘米深的泥土，可以選擇近濕地的土壤或在溝渠堆積的沙泥，收集約2-3千克的重量。

Use a large spade to dig into the soil for about 10cm depth in places near to the wetland or in the ditch with accumulated sand. Collect about 2-3 kg in weight.

### 4. 水中藻類 Algae in the stream

在溪流較靜水的位置，尋找綠色或褐色浮於水中的絲綫狀水藻，利用鉗子和小瓶收集。

Search for the green or brown filamentous algae in the slow moving region of the stream, collect them by using a pair of forceps and a small vial.



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

樣本 ( 枯枝落葉、牛糞、泥土 ) Sample (litter, cow dung, soil)

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。

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

樣本 ( 水藻 ) Sample (algae)

觀察水藻樣本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。嘗試分類及估算各種的相對數量，並可拍下照片。

For the observation of algae, 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 and estimate their relative abundances of different species and even take photos of them.

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

生物名稱 Species name	小生境 Microhabitats <sup>#</sup>	個體數量 Number of individuals <sup>*</sup>	營養模式 Modes of nutrition <sup>^^</sup>

<sup>#</sup>1. 枯枝落葉 Litter, 2. 牛糞 Cow dung, 3. 泥土 Soil, 4. 水藻 Algae

<sup>\*</sup> 超過20以上的，可估算最接近的十位數。If over 20, estimate its number to the nearest tens.

<sup>^^</sup> 1.自養 Autotroph, 2. 植食 Herbivore, 3. 肉食 Carnivore, 4. 雜食 Omnivore, 5. 食腐植 Detritivore, 6. 食腐肉 Scavenger

## 分析討論 Analysis and Discussion

### 1. 小生境中的生物多樣性 Diversity of life in the microhabitats

記錄不同小生境中的物種，描述牠們的外貌特徵與小生境特質的關係。

Record the species composition of different microhabitats, describe their external features in relation to their characteristics of that particular microhabitat.

### 2. 生物個體數量與進食模式 Relative abundance and their diet

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 dominant species or other species numbers in the microhabitats and any relationship with their diet.

### 3. 描繪不同小生境的食物網 Illustrate the foodwebs of different microhabitats

利用所得的資料和數據，描繪不同小生境的食物網或生態互動關係。

Using the collected data and information, illustrate the foodweb of different microhabitats or the interactions between the organisms.