



# 實驗有關作業 - 野外生態考察

## Practical Related Task- Ecology Field Work



### 枯枝落葉堆中的奇趣生態

### Interesting ecology in the litter

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. 鞏固對碳循環的認知 Consolidate the knowledge of carbon cycle;
2. 明白枯枝落葉堆小生境的物理特質 Understand the physical characteristics of the litter microhabitat;
3. 探索枯枝落葉堆小生境的技巧 Acquire the skill in exploration of the litter microhabitat;
4. 辨別棲息於枯枝落葉堆中的動物及認識其適應特徵 Identify the animals found in the litter micro-habitat 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

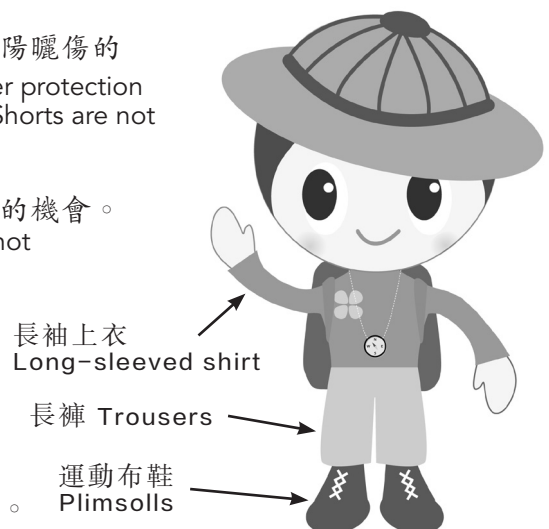
1	寫字夾板 Clipboard	
2	平板電腦/ 數碼相機 Tablet computer/Digital camera	
3	放大鏡 / 微距望遠鏡 Magnifying glass /Macroscope	
4	圖鑑 Pictorial Guides	
5	膠袋、手套、收集器 Plastic bag, gloves, collecting device	
6	土壤溫度計 Soil thermometer	
7	30厘米鐵尺 Steel ruler 30cm	

#### 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. 枯枝落葉堆的特質 Characteristics in the litter

在考察地點，檢視不同位置的枯枝落葉堆，並記錄以下的一些數據。

At the field study site, check for the characteristics of litter at different positions and record the following data.

特質 Characteristics	樣本一 Sample 1	樣本二 Sample 2	樣本三 Sample 3	樣本四 Sample 4	樣本五 Sample 5
附近植物 Vegetation nearby					
葉堆下的基質 The substratum					
葉堆深度 The depth					
枯葉大小、形狀和顏色 Litter size, shape and colour					
葉堆表面溫度 Surface temperature of litter					
葉堆內裡溫度 Inner temperature of litter					
枯枝落葉堆的動物 Animals found in the litter					

## B. 收集枯枝落葉 Collect the litter

在已檢視和記錄的枯枝落葉堆的樣本一至五中，只要揀選並收集其中一個葉堆便可以。收集時，請迅速將枯葉和其底部的一些土壤（若有），一併利用收集器撿取，並放進一個大膠箱內，進行下一步實驗室的檢測。

From the checked and recorded sample 1-5, choose one of them for collecting. During the collection, if there are soil underneath the litter, try to collect them also using the tailormade device and put them into the large plastic box for further analysis in the laboratory.

### 1. 量度枯葉水份含量 Measure the water content in the litter

抽取小部份枯葉，先量度重量，再放入焗爐30分鐘，再次度量，便可得出枯葉的水份含量。

Extract a small portion of litter and measure its weight, put into the oven for 30mins, weigh again to calculate the water content in the litter.

錶面玻璃(克) Watch glass (g)	濕枯葉(克) Wet litter (g)	乾枯葉(克) Dry litter (g)	(濕枯葉 - 乾枯葉) / 濕枯葉 x 100% = (Wet litter - dry litter) / wet litter x 100% =



## 2. 杜勻氏漏斗實驗 Tullgren funnel experiment

在大膠箱內，用刮勺把較細碎的枯葉堆放進漏斗，約一半滿，然後設置放好和開燈，最底放有水的小瓶，待第二天可以檢查小瓶內的生物。

In the plastic box, find the smaller broken pieces of litter and using the spatula to put them into the funnel. Set up the Tullgren funnel with light on, the bottom vial filled with some water and left them overnight. Checking the organisms found inside the vial in the next day morning.

生物名稱 Name	外貌特徵 External Features	生物名稱 Name	外貌特徵 External Features

## 3. 檢視枯枝落葉堆中的生物 Check for the organisms in the litter and soil

利用工具仔細分散，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。嘗試分類及點算各種的數量。

Find out the organisms carefully with appropriate tools. If the organisms are too small, put it under the dissecting microscope for observation. Try to identify and count their numbers of different species.

枯葉／泥土中的動物品種 Animals species in litter /soil	外貌特徵 External Features	個體數量 No. of individuals	進食模式（肉食、食腐植等） Diet (Carnivorous, Detritivorous etc.)

## 分析討論 Analysis and Discussion

### 1. 枯葉堆的多樣性 Diversity of litter

利用考察所得資料，枯葉堆的生物多樣性會較受那些因素影響如附近植物品種、基質、枯葉新鮮程度、溫度等。

Use the data collected from the field survey, what are the factors such as nearby vegetation, substratum, freshness of litter or the temperature etc, determining the biodiversity in this micro-habitat.

### 2. 尋找生物的方法比較 Compare the methods in searching for organisms

杜勻氏漏斗實驗和直接尋找生物的結果有甚麼分別？兩種方法的優劣比較？

Any differences between the Tullgren funnel experiment and direct searching method results? Compare their advantages and disadvantages for both methods.

### 3. 枯葉堆中生物的適應特徵 Adaptation features of animals in the litter

在枯葉堆中生存的生物有沒有共同的外貌特徵？牠們各自又有沒有特別的適應結構和行為特徵？

Any similarity among the animals found in the litter? Do they have other special adaptation structure or behaviour characteristic for surviving under such condition?