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Caritas Chan Chun Ha Field Studies Centre

Exploring Woodland in Cheung Chau (2 days - B)

Student Name: _____ **Group no.:**_____

Course Date: _____

Objectives

- Knowledge:- To understand the characteristics of abiotic and biotic components of a woodland ecosystem
  - To understand human interference on woodland environment
- Skills:
  - To collect data collection of vegetation and soil
  - To compare and analyze first-hand data
- Attitude:
  - To cherish the interdependence of human and natural environment
  - To nurture students' concern of the tropical rainforest and awareness of the importance of protection of tropical rainforest on safeguarding national ecological security.

Relevance to the DSE geography curriculum

- Disappearing Green Canopy – Who should pay for the massive deforestation in rainforest regions?

---------- STAGE 1: PLANNING & PREPARATION ----------

Key point of fieldwork: Impact of deforestation to the environment

(In general, the environment will degrade after deforestation. In this study, **grassland is simulated as the condition of after deforestation**, with no trees)

Prior knowledge

Refer to the module of "Disappearing Green Canopy" in the textbook and study Figure 1. Choose the letters from dotted boxes and put into suitable boxes in Figure 1.

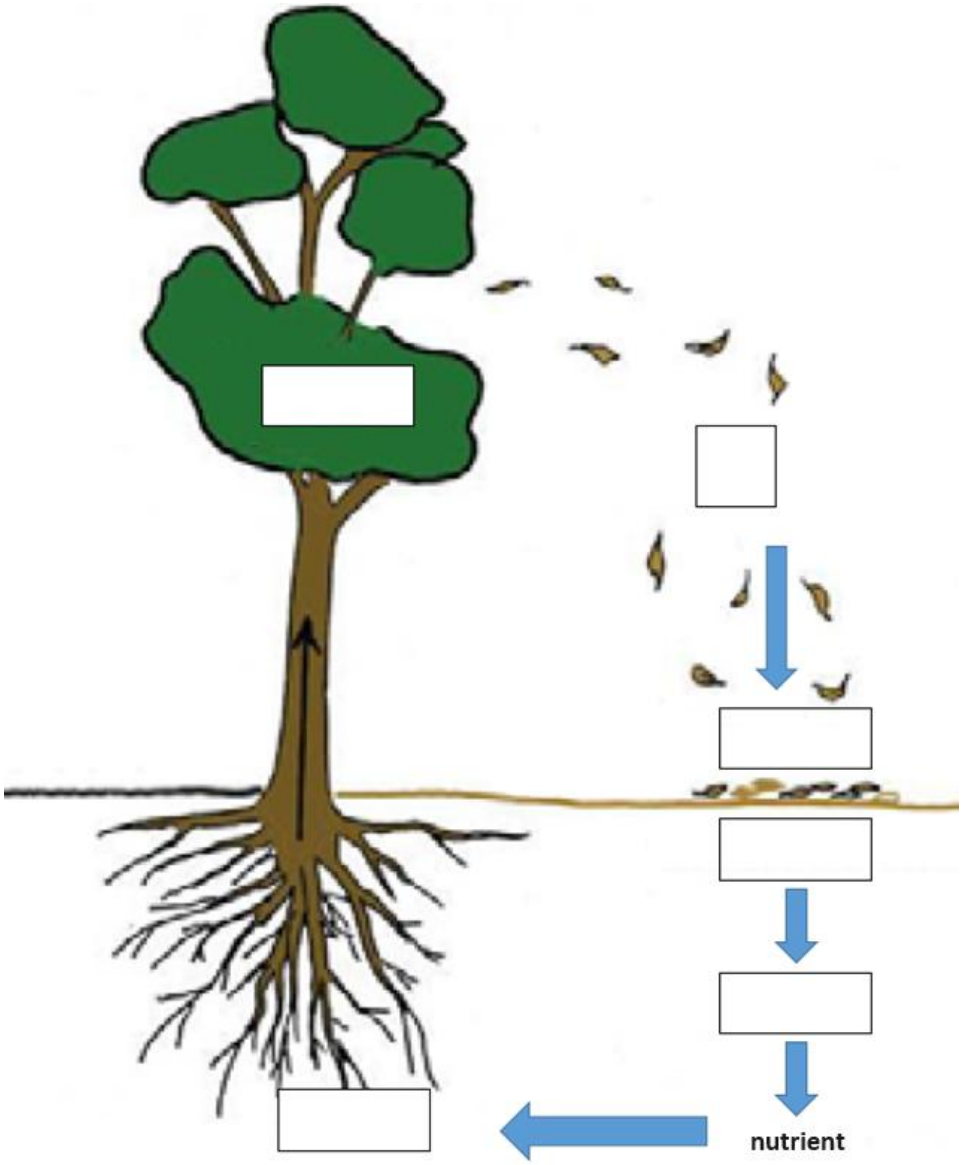


Figure 1 Decomposition of litter

A. dead leaves B. decomposition C. plant absorption D. humus E. biomass

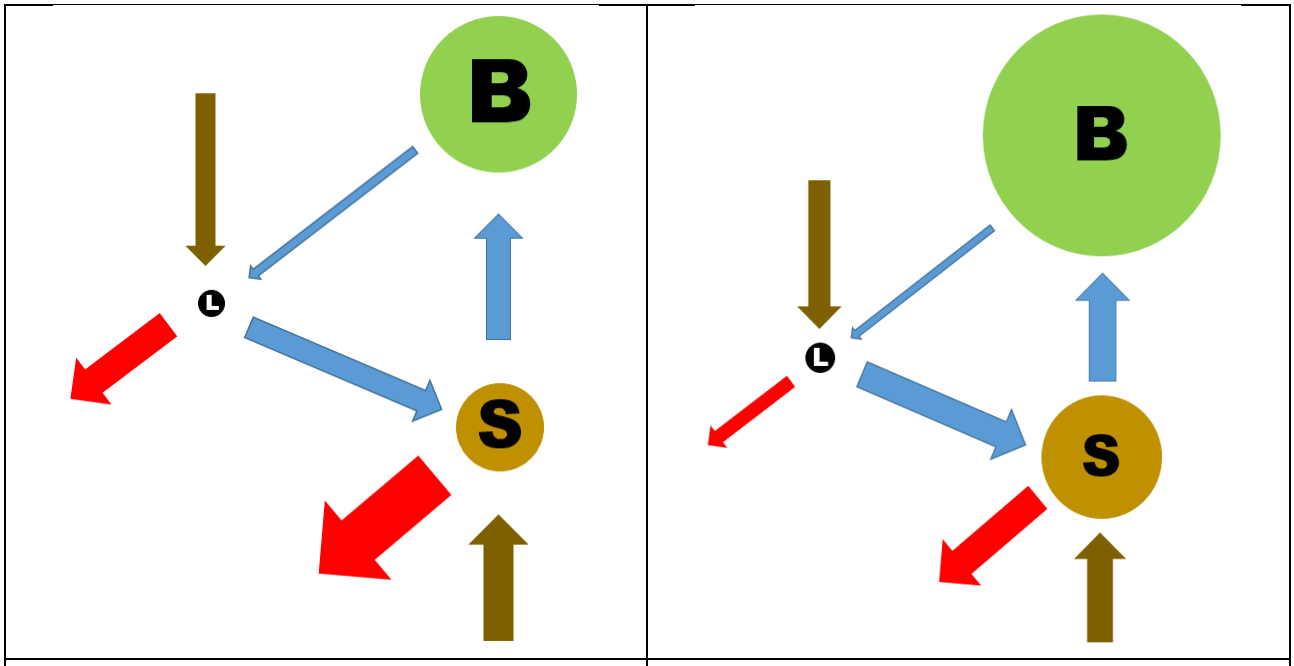


Figure 2a | Figure 2b

Figure 2 Nutrient cycle before and after deforestation

1. Refer to Figure 2, what do B、L、S represent?*(Hint: litter, soil nutrient, biomass)*

_____

2. Which of the above figure show the nutrient cycle before and after deforestation?

Figure 2a：_____；Figure 2b：_____

3. After deforestation, what changes may happen to the soil and environments of woodland?

Soil (Hint: Lithosphere, soil characteristics)	**Environment (Hint: atmosphere, micro climate, hydrosphere, biosphere)**

➢ To set the enquiry question

How will the environment be changed after deforestation?

Hypothesis:

a) In comparison to woodland, the soil infiltration rate of grassland is lower / higher.

b) In comparison to woodland, the litter storage of grassland is lower / higher.

c) In comparison to woodland, the micro climate of grassland is more stable / less stable.

d) In comparison to woodland, the biomass of grassland is lower / higher.

➢ When to collect data?

Date: _____	Time: _____ to _____	What factors do you consider when selecting fieldwork date?
Cloud cover: clear sky / few clouds / scattered clouds / overcast sky		
Weather warning and signals within last 2 days: ☐ Strong Monsoon Signal ☐ Rainstorm Warnings ☐ Tropical Cyclone Warning Signals ☐ Thunderstorm warning Precipitation within last 2 days: heavy rain / drizzle / never rain		Is today an ideal day for conducting woodland field trip? Why?

➢ Where to collect data?

Field site of today: _____ Refer to the map on p.10, is it an ideal place to visit? What factors do you consider when selecting field sites?	Which sampling method is used if students set up data collection locations as follows? (refer to the sampling method on p.12) 1. To conduct sampling for different plant communities. 2. To choose the most representative location as the sampling point in different vegetation communities.

➢ What data to collect?

Match the following research items with the appropriate primary data collection method and equipment.

A. observation	**B. measurement**	**C. counting**	**D. category**	**E. Distribution (mapping)**
F. scoring	**G. field sketching**	**H. questionnaire**	**I. in-depth interview**	

	Research item	**Primary data collection methods** (You may choose more than ONE)	**Equipment (refer to p.6)**	**Operational precautions**
Soil	Infiltration rate			
	Degree of compaction			
	Soil moisture			
	Soil fertility			
Litter	Weight			
Litter fauna	Amount			
	Type			
Biomass				
Environment	Micro climate			

Instrument and equipment

Name	Photo	Quantity (each group)	Name	Photo	Quantity (each group)
1. soil infiltration test kit		1	9. light meter		1
2. soil compaction tester		1 (share)	10. anemometer		1
3. trowel		1	11. soil moisture meter		1 (共用)
4. soil sample bottle (labelled)		2	12. soil NPK meter		1 (共用)
5. quadrat		1	13. forecep		1
6. plastic bag (litter collection)		2	14. Spring balance		1
7. gloves		1	15. basket strainer		1
8. thermo-hygrometer		1			

** Make sure you know how to use the equipment correctly before fieldwork.*

---------- STAGE 2: DATA COLLECTION ----------

1. Go to grassland AND woodland. Collect soil data: ①soil infiltration rate, ②soil compaction level
2. Go to grassland OR woodland. Collect ①soil sample, ②litter, biomass data of vegetation, measure micro climate

---------- STAGE 3: DATA PROCESSING & PRESENTATION ----------

1. Collect and integrate the data of each group and fill in the table below.

Area / **Group**		**Grassland**				**Woodland**			
Micro climate (average)	Air temperature (°C)								
	Relative humidity (%)								
	Wind speed (m/s)								
	Light intensity (lux)								
Weight of litter (g)									
Litter fauna (refer to ID kit)									
Herbivore (type & amount)									
Carnivore (type & amount)									
Omnivore (type & amount)									
Decomposer (type & amount)									
Soil									
Soil fertility level	Available N (low/medium/high)								
	Available P (low/medium/high)								
	Available K (low/medium/high)								
Soil moisture (%)									
Soil compaction level (cm)									
Soil infiltration rate (Class) *(see table below)*									

Class	Soil infiltration rate **(10 cm/s)**
Very slow	> 300s
Slow	>120-300 s
Moderate	>30-120 s
Fast	>10-30 s
Very fast	< 5-10 s

2. What diagram can show the following situations? Write the name of diagram below.

Situations	Name of diagram
a) Show difference of soil infiltration rate before and after deforestation	
b) Show difference of litter amount before and after deforestation	
c) Show the trend of micro climate before and after deforestation	
d) Compare the biomass of grassland and woodland	

---------- STAGE 4: INTERPRETATION & CONCLUSION ----------

Are your hypothesis valid? Explain with reference to the data collected. Explain whether there are other factors which might support your conclusion.

1. Hypothesis: After deforestation, the soil infiltration rate will become lower / higher.	Hint: I expect "After deforestation, the soil infiltration rate will become lower / higher." The result is consistent / inconsistent with my hypothesis. Which location has the highest soil infiltration rate? Why? Factors: time/ weather/ feature of sampling plot/ sampling location/ human factor. What field evidence are there? What is/are the dominant factors affecting soil infiltration rate?
2. Hypothesis: After deforestation, the litter storage will become lower / higher.	Hint: I expect "After deforestation, the litter storage will become lower / higher." The result is consistent / inconsistent with my hypothesis. Which location has the highest litter storage? Why? Factors: your discussion (p.4)/ time/ weather/ feature of sampling plot/ sampling location/ human factor. What field evidence are there? What is/are the dominant factors affecting litter storage?
3. Hypothesis: After deforestation, the micro climate will become more stable / less stable.	Hint: I expect "After deforestation, the micro climate will become more stable / less stable." The result is consistent / inconsistent with my hypothesis. Are the micro climatic data of different groups consistent? If not, why? Factors: your discussion (p.4)/ time/ weather/ feature of sampling plot/ sampling location/ human factor. What field evidence are there?
4. a) What are the difference in litter characteristics (level of decomposition/ amount and type of litter fauna b) What are the difference in soil characteristics (soil fertility/ soil moisture) after deforestation? Why?	

---------- STAGE 5: EVALUATION ----------

Factors affecting the data reliability and validity		Suggestion for improvement
Fieldwork date/ time ◆ Fieldwork date and time representative? ◆ Any impact by today's weather condition?		
Field site/ study area ◆ Field sites match with research topic? ◆ Field study area adequate?		
Location of data collection (Sampling) ◆ Sampling method in choosing field site appropriate? ◆ Location of measurement representative? ◆ Sample size sufficient?		
Data collection items/ methods ◆ Data collection items adequate to respond the enquiry questions? ◆ Are the data obtained from the data collection method(s) objective and without bias? ◆ Any inadequacy about the equipment/ instruments? ◆ Measurer using the equipment/ instruments correctly?		

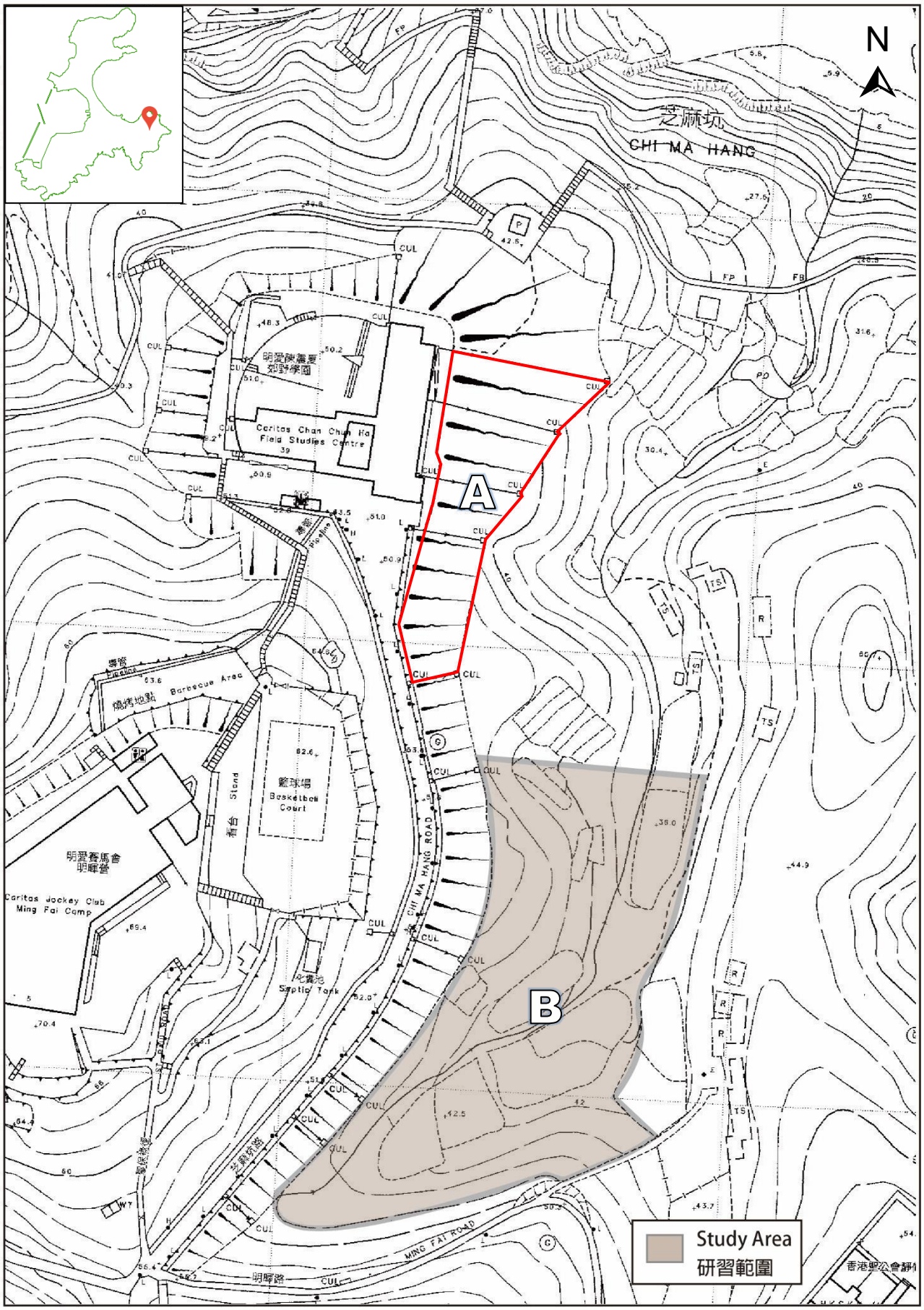
Further study

From today's result, what other aspects of woodland can be explored? Formulate and elaborate your study plan (e.g. field site/ date/ time/ hypothesis/ data items/ sampling methods, equipment, etc.)

Homework

After the fieldwork, complete the field trip diary (p.11-12) as a means to consolidate this fieldwork experience and reference for revision of field-based question.

Exploring woodland in Cheung Chau (2B)



My Field Trip Diary

- Related modules: Disappearing Green Canopy
- Key point of fieldwork/topic: To examine the impact of deforestation to the environment.

▪ Date:_____ (Weekday/ Public holiday) ▪ Time:_____ ▪ Field site: _____	▪ Weather condition:
Is the above planning appropriate for the fieldwork?	

- Primary data:

Data collection method	Data collected	Equipment/ Material (if any)	Merit/ Limitation of the data collection method (give examples)	Suggestion for improvement (give explanations)
❑ Measurement				
❑ Observation				
❑ Counting				
❑ Questionnaire/ Interview				
❑ Other (if any)				

- Secondary data:

Data collected	Use	Data obtained from
Apart from the above, what other secondary data could be used for further investigation?		

- Sampling method (if any):

Sampling method	Applied in the following	Merits☺/ Demerits☹

- Data processing and presentation:

Type of graph/ chart	Content shown and function of graph/chart	Merits☺/ Demerits☹

- For deeper learning or further study, I suggest modify the following aspects.

		Suggestion (give examples)
❑	Key point of fieldwork/ topic	
❑	Data to be collected and method of data collection	
❑	Date and time of fieldwork	
❑	Field site	

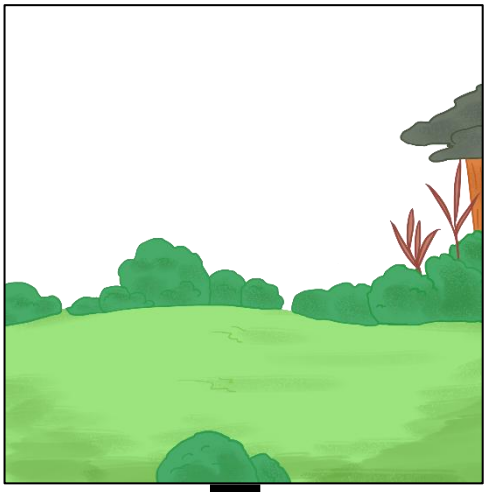
Primary data collection methods

Data collection methods	Explanations		Examples
A) Observation	● Using sensory observation to explore the details of research subject (people, things or environment) in a purposive and planned way. Data are recorded using text, photos, sketch, map, etc. (Refer to other data collection methods listed below)		● Identification of the surrounding environment of a field site
B) Measurement	● To estimate or measure the physical quantity of the research subject. It usually requires the use of equipment or tools. Data are usually shown in certain standard, weights or measures.		● Measurement of the width of street and the building height
C) Counting	● To record the number of occurrence of a single item.		● Statistics of pedestrian flow at the pier
D) Category	● To classify based on the nature, characteristics and uses: ♦ to group the same or similar things; ♦ to separate different things.		● Types of goods sold in supermarket ● Customers (serving local residents and tourists) of different shops
E) Distribution (mapping)	● To group similar things according to the research topic (similar to "**D. Category**"); ● Only suitable for spatial representation (different from category); ● Useful in showing the mode of occurrence of research subject in a complex environment.		● Distribution of shops selling big fish balls in Cheung Chau
F) Scoring	● To quantify abstract or subjective concepts; ● To merge various data for easy comparison; ● Scoring items should include different aspects.		● Risk index of natural hazards of Cheung Chau ● Air Quality Health Index (AQHI)
G) Field sketching	● To make simplified drawing of the field site to show what the data collectors observed. Annotations related to the research subject are added to provide key feature or additional information.		● Draw the characteristics and formation of weathering landforms
H) Questionnaire	● Forms: face-to-face, telephone, written, etc.; ● Using questionnaire to understand the opinion of research subject; ● Larger sample size than "**I. in-depth interview**"; ● Mainly closed questions (with options available).	● To collect information by questioning; ● To obtain information which is difficult to be obtained through observations; ● To understand the rationales and opinions of interviewees.	● The main reasons for tourists to visit Cheung Chau ● The level of satisfaction among residents regarding a revitalization project
I) In-depth Interview	● To obtain information through face-to-face/ telephone interview; ● Smaller sample size than "**H.Questionnaire**"; ● Mainly open questions and forthcoming questions will change upon the answer of respondents.		● Opinions of District Council members on the future development of that district

Sampling Methods

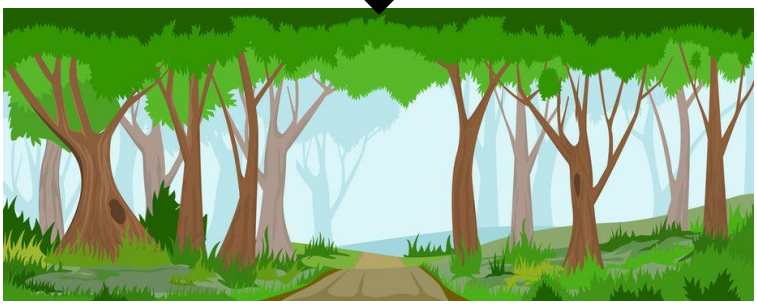
	Probabilistic sampling methods ➢ *Need to know the size of population;* ➢ *Few differences among individuals;* ➢ *Individual has equal chance of being selected;* ➢ *Representativeness of data depends on sampling percentage.*			**Non-probabilistic sampling methods** ➢ *Size of population might not be relevant to the research objective;* ➢ *Chance of individual being selected is unknown;* ➢ *Representativeness of the results depends on the judgment of researcher in sample selection (Such as the correlation between samples and research targets).*		
Sampling methods	**Simple random sampling** (簡單隨機抽樣)	**Systematic sampling** (系統抽樣)	**Stratified sampling** (分層抽樣)	**Quota sampling** (配額抽樣/ 定額抽樣)	**Convenience sampling** (便利抽樣/ 方便抽樣)	**Purposive sampling** (立意抽樣)
Explanations	To select sample from the **whole population randomly**. (using computer program, bamboo slip or random number table)	Each member of the whole population is sequentially numbered, then selected according to a **fixed, periodic interval**.	The whole population are classified according to the variable and divided into separate stratum. Then samples are selected randomly by proportion from each stratum.	The whole population are classified according to the variable and divided into separate stratum. Then desired number (quota) of samples are selected from each stratum.	Research subjects are selected due to convenience of recruitment.	Samples are selected according to research objectives and special requirements.
Examples	To choose a certain number of students to conduct questionnaires/ surveys according to the class number.	To measure the noise level of a street in a regular interval.	To group buildings according to their ages (e.g. above or below 50), and select a certain number of buildings in each group randomly.	To select a certain number of male and female customers, then record the amount spent in a shop.	To interview a certain number of relatives who work in mainland China To interview a certain number of passersby on the street	To conduct an in-depth interview with a district councilor about the social problems of that district.
Remarks	Suitable for small population and few variations among samples (for relevant research objectives).	Suitable for large population (hidden cyclic ordering which may affect the representativeness of data).	Effectively show the relationship / effect between variables.	Effectively show the relationship / effect of variables, but the characteristics and size of samples are judged subjectively.	Should not generalize the data to larger population	Suitable for qualitative research (data is easily influenced by the subjective judgment of researcher)

Task allocation



Part 1: Grassland

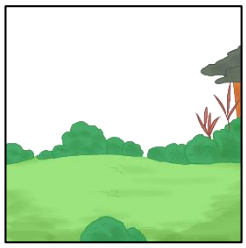
1) select sampling location *
2) use quadrat to delimit sampling location
3) soil compaction test
4) soil infiltration test
5) collect biomass data **(Grassland group, 1 sample)**
6) collect soil sample **(Grassland group, 1 sample)**
7) collect litter **(Grassland group, 1 sample)**



Part 2: Woodland

1) select sampling location *
2) use quadrat to delimit the sampling location
3) soil compaction test
4) soil infiltration test
5) collect biomass data (**Woodland group. 1 sample,** choose presence of tree)
6) collect soil sample **(Woodland group. 1 sample)**
7) collect litter **(Woodland group. 1 sample)**

Walk to grassland or woodland, select the most representative location *



Part 3: measure micro climate

1) stand at sampling location *(note if there are interference to the data at the sampling location)*
2) measure micro climatic element
- *note if the time interval and number of measurement*
- *note the operational precaution*

Go back to classroom

Return ☐ fieldwork equipment

Submit ☐ soil sample (write label)

☐ litter

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Date:_____
Time:_____
Weather: sunny / cloudy / rainy/ windy

Data record sheet Fieldwork tasks

1. Soil infiltration rate ─ use the soil infiltration test kit to measure the soil infiltration rate.

Soil infiltration rate (10cm/s)	Grassland:	Woodland:

2. Level of soil compaction – measure the depth of soil compaction at 200psi.

Level of soil compaction (cm)	Grassland:	Woodland:

3. Biomass

Grassland		**Woodland ***	
Area of quadrat		DBH (cm)	
Height of grass/herb (cm)		Tree height (m)	
Biomass (kg)		Biomass (kg)	

* Biomass = DBH x tree height x form factor

3. Collect soil sample and litter ☐ grassland ☐ woodland ☐ soil sample ☐ litter

4. Micro climate (grassland/ woodland)* Measure micro climatic element every _____ minutes in a total of _____ minutes.

	Time	**Micro climatic elements**			
		Air temp (°C)	R.H. (%)	Wind speed (m/s)	Light intensity (Lux)
1	_____ : _____				
2	_____ : _____				
3	_____ : _____				
4	_____ : _____				
Average					

Labwork		**Grassland**		**Woodland**	
Soil fertility	Available nitrogen ,N (ppm)				
	Available phosphorus, P (ppm)				
	Available potassium, K (ppm)				
	Total (ppm)				
Soil moisture		%		%	
Litter	Weight	g		g	
	Decomposition level	Low / Medium / High		Low / Medium / High	
Litter fauna (type & amount)	Herbivore	Type:	Amount:	Type:	Amount:
	Carnivore	Type:	Amount:	Type:	Amount:
	Omnivore	Type:	Amount:	Type:	Amount:
	Decomposer	Type:	Amount:	Type:	Amount:
	Total types; total amount	Type:	Amount:	Type:	Amount: