



# Coast Study

Enquiry Skills Approach, Version 2.0

## A. Planning and Preparation

### Module

Managing coastal environment

### Enquiry Question

Question 1 : *What is the profile gradient at the sampling area?*

Hypothesis 2 : *The longer the distance from the shore, the larger the size of sediment.*

Question 3 : *What is the relationship between the distance and direction of longshore drift and wind?*

### Key Concepts

Tides	Types of waves	Swash	Backwash	Headland
Bay	Fetch	Offshore gradient	Sorting process	Longshore drift

### Scope of the Study

- Lido Beach in Sham Tseng, or
- Beach in Whitehead, Wu Kai Sha

### Time of the Study

Date: \_\_\_\_\_ (weekday / weekend)      Rainfall in the past 24 hours: \_\_\_\_\_

Browse the website of Hong Kong Observatory, and record the tidal information of the selected field site.

- High tide:                      Time \_\_\_\_\_                      Height \_\_\_\_\_ m
- Low tide:                        Time \_\_\_\_\_                      Height \_\_\_\_\_ m
- Tide level during field work: Time \_\_\_\_\_                      Height \_\_\_\_\_ m

### Think About

Is this an appropriate time for fieldwork? Explain your answer.

List the safety risks when conducting coastal fieldwork.

## **Field Work Plan**

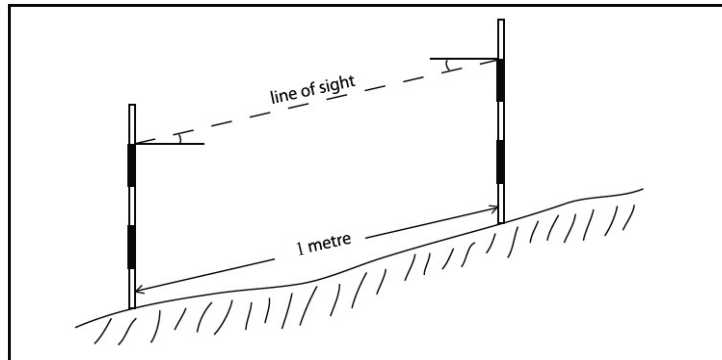
### A1 Setting Transect

1. Set up a 12 m long transect perpendicular to the shore, which best represents the beach profile.
2. Run 3 m of the transect into the sea and the rest along the profile to the backshore.

### A2 Profile Gradient

1. By using the measuring tape, ranging poles and abney level, measure the gradient along the transect at every 1 m intervals (see Figure 1.1).
2. Record the data in Table 1.2 and draw the profile in Figure 1.6.

**Figure 1.1 - Beach Profile**



### **Think About**

Suggest another method to measure beach profile.

### A3 Sediment Size and Shape

1. Collect about 50 g surface sediment with trowel and a small plastic bottle.
2. Analysis of the sediment size and shape will be carried out in the laboratory.

### A4 Swash and Backwash

1. Count the number and observe the strength of swash and backwash in one minute and record them in Table 1.3.

### A5 Longshore Drift

1. With the compass and anemometer, measure the wind direction and wind speed for 1 minute.
2. Throw the bottle/ float provided into the sea near the shore.
3. Observe the route and horizontal displacement of the bottle/ float carefully for 1 minute, and record them in Table 1.4.

## **Laboratory Work**

### B1 Sediment Size and Shape

1. Weigh 50 g of dried sediment by using electronic balance.
2. Pour the dried sediment onto a nested column of sieves provided. (The sieves should be placed in order with the openings diameter decreasing from top to bottom.)
3. Put the lid back on the column of sieves and hold them firmly with both hands. Shake the column horizontally and softly for 5 minutes.
4. Pour the sediment of each sieve onto a paper and weigh them with the electronic balance.
5. Record the data in Table 1.5 and calculate the percentages of each sediment size.
6. Use a 10 times magnifier to observe the shape of sediment.

## B. Data Collection

Complete the following table.

Primary Data Items	To Examine			Data Collection Method			Equipment Required (No. on the Equipment Checklist)
	Q1	H2	Q3	Observation	Counting	Measuring	
1. Profile Gradient							
2. Sediment Size and Shape							
3. Swash and Backwash							
4. Distance and direction of Longshore Drift							
5. Wind direction and wind speed							

### Think About

List the secondary information used in the field work.

### Sampling Method

1. Systematic Sampling

### Equipment Checklist

Items		Quantity	Checked	Returned
1.	Base map (Individual)	x 1	<input type="checkbox"/>	<input type="checkbox"/>
2.	Clipboard (Individual)	x 1	<input type="checkbox"/>	<input type="checkbox"/>
3.	Compass (Individual)	x 1	<input type="checkbox"/>	<input type="checkbox"/>
4.	Measuring tap - 30m	x 1	<input type="checkbox"/>	<input type="checkbox"/>
5.	Ranging pole	x 2	<input type="checkbox"/>	<input type="checkbox"/>
6.	Level meter	x 2	<input type="checkbox"/>	<input type="checkbox"/>
7.	Abney level	x 1	<input type="checkbox"/>	<input type="checkbox"/>
8.	Anemometer	x 1	<input type="checkbox"/>	<input type="checkbox"/>
9.	Float	x 2	<input type="checkbox"/>	<input type="checkbox"/>
10.	Trowel	x 1	<input type="checkbox"/>	<input type="checkbox"/>
11.	Small sampling plastic bottle	x 1	<input type="checkbox"/>	<input type="checkbox"/>
12.	Gloves	x 4	<input type="checkbox"/>	<input type="checkbox"/>
13.	Plastic bucket	x 2	<input type="checkbox"/>	<input type="checkbox"/>

### Laboratory Work Equipment Checklist

1. Crucible	2. Sieves	3. Electronic balance	4. Electric Oven
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### Think About

List possible errors when collecting data.

**Data Recording Sheet (Field Site: \_\_\_\_\_ )**

**Table 1.2 - Profile Gradient**

1	2	3	4	5	6	7	8	9	10	11	12

**Table 1.3 - Number of Swash and Backwash**

Number of Swash: _____/min	Number of Backwash: _____/min
Strength of Swash: <u>Stronger / Weaker</u>	Strength of Backwash: <u>Stronger / Weaker</u>

**Table 1.4 - Longshore Drift**

	Float:	Float:
Wind Direction		
Wind Speed (m/s)		
Direction of Longshore Drift	From _____ to _____	From _____ to _____
Horizontal Displacement of Longshore Drift (cm)		

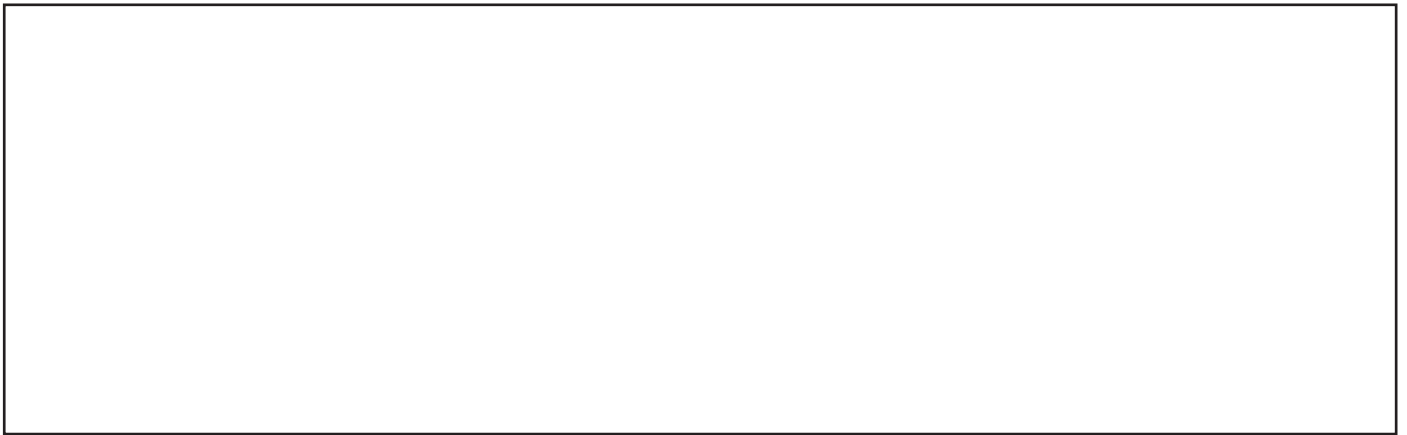
**Table 1.5 - Sediment Size**

	Weight of Crucible and Sediment (g)	Net Weight of Crucible (g)	Net Weight of Sediment (g)	Percentage (%)
	(A)	(B)	(C) = (A) - (B)	$\frac{(i) \text{ or } (ii) \text{ or } (iii)}{(D)} \times 100\%$
Total Sediment			(D)	
Diameter >2mm			(i)	
Diameter >0.063-2mm			(ii)	
Diameter <=0.063mm			(iii)	

### C. Data Processing, Presentation and Analysis

Use appropriate graphs and diagrams to present the data collected.

**Figure 1.6 - Beach Profile**



#### **Think About**

List the merits and demerits of the chosen graphs or diagrams.

### D. Interpretation and Conclusion

1. Summarize the main findings and graphs, describe *the profile gradient of the sampling area*.

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2. Does the fieldwork result support the Hypothesis1: *“The longer the distance from the shore, the larger the size of sediment.”* ? Support your conclusion with the collected data and graphs.

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3. Summarize the main findings and graphs, describe and explain *the relationship between the distance and direction of longshore drift and wind.*

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### E. Evaluation

1. Other than the data collected in this course, suggest other enquiry question, data and information you might need for a field work in the field site. Explain your answer.

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#### Further Reading



大灣區的水資源



從閱讀中學習中國地理  
(第一部分)：自然環境



從閱讀中學習中國地理  
(第二部分)：人文環境