



Study of a Rocky Shore Ecosystem

Name: _____ Group: _____ Date: _____

Aims:

After the course, students should be able to:

1. Classify and identify organisms commonly found in a local rocky shore habitat ,
2. Observe how organisms adapt to the physical environment,
3. Distinguish interrelationships between living organisms in an ecosystem,
4. Record and measure physical factors in a rocky shore ecosystem,
5. Use simple sampling tools,
6. Do simple chemical analysis of water sample in the laboratory,
7. Analyze and organize data for presentation,
8. Cooperate with others and work together in a scientific investigation
9. Appreciate nature and respect living things.

Schedule:

9:00 - 10:00	Briefing
10:30 - 12:30	Field work
13:00 - 14:00	Lunch
14:00 - 14:50	Lab. work & Data analysis
14:50 - 15:30	Prepare presentation
15:30 - 16:30	Presentation & summary

Equipment and tools:

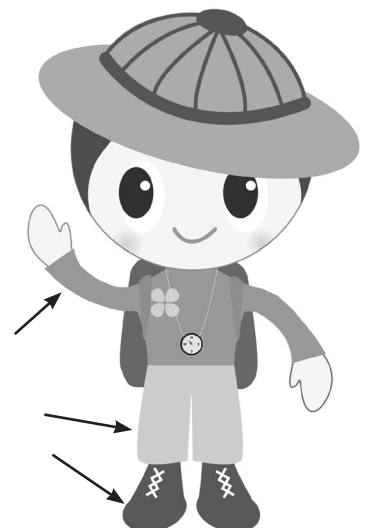
1	Clipboard (x1)	10	Water sampling bottle (x1)
2	Light meter (x1)	11	Compass (x1)
3	Digital thermohygrometer (x1)	12	Nylon thread (x1)
4	Digital anemometer (x1)	13	Cotton gloves (x2 pairs)
5	Trowel (x2)	14	Wildlife Pictorial Guide (x1)
6	Forceps (x2)	15	Hard Shore Organisms (x1)
7	Magnifying glass (x2)	16	Hong Kong Coastal Plants (x1)
8	Quadrat 0.5 x 0.5 m (x1)		
9	Plastic sorting tray (x1)		

Clothing:

1. Long-sleeved shirt and trousers for better protection against mosquito and insect bites, as well as preventing sunburn. Shorts are not recommended.
2. A pair of shoes for preventing injuries. Slippers and sandals are not recommended.

Safety:

1. Never go into the water for swimming and other activities.
2. Beware of the slippery rock surface. Move slowly and try footing for eah step.
3. Beware of the sharp edges of rock oyster and barnacles which can cause serious wound.



A. Selecting site

Select two different rocky shores e.g. boulders shore and the rubbles shores for comparison purpose. Avoid the steep slopes rocky shore for field study.

B. Recording biotic factors

1. Animals

- Place a 0.5 m X 0.5 m quadrat on the hard surface near sea water (lower region of the intertidal zone). Pick up the animals found on the rock surface within the quadrat, identify and count in the tray. If there are stones within the quadrat, lift the stones to look for animals hiding beneath. Use a trowel, carefully dig out animals in the soil, identify and count.
- Place the quadrat at the higher region of the intertidal zone and the splash zone respectively. Repeat the above process.
- Do qualitative survey of animals at different microhabitats in the rocky shore, such as shaded areas of rock surface, in the crevices or gaps between rocks, rock pools, etc.
- Note any special behaviour and morphological features related to their feeding, defence against predators, prevention of overheating and desiccation, etc.
- Notice various relationships between organisms, namely predation, competition, commensalism, mutualism and parasitism. Look for examples in the field.

2. Plants

- At the backshore, look for the grass, shrub, and trees growing on the substratum and try to identify them into species with the guide. At the same time, record any special characteristic of their leaves, roots, branches, trunks, fruits and flowers etc.
- Pay attention to features which are related to withstanding the strong wind, lack of substratum and freshwater deficiency etc.

3. Others

- At the intertidal zone, identify and record the cyanobacteria, algae, lichen etc. on the rock surface. Try to identify them into species using the guide.
- Carefully observe and compare the growing position, colour, external features and morphologies of cyanobacteria, encrusting algae, erect algae and lichen.

C. Measuring abiotic factors

- Note down recent weather conditions such as rainfall, sunshine and temperature.
- Describe the physical environment near the rocky shore, such as shore orientation, habitat types, location of village and possible human impacts. Draw a sketch map to show relevant information.
- Measure the following physical factors in the general environment and different micro-habitats at two study sites respectively. Take three measurements in different positions and take the mean value.
 - Digital thermohygrometer for measuring air temperature and relative humidity.
 - Light meter for measuring light intensity.
 - Anemometer for measuring wind speed and the compass with a nylon filament for measuring wind direction.

D. Water sampling

Use a water sampling bottle to collect water sample at the location closer to your study area. Bring the water sample to the laboratory for further chemical analysis.

E. Laboratory work

- Open the sampling bottle's cap and put the D.O. meter probe into the bottle directly. Wait for the readings become steady (about 30 sec.) and record the Dissolved Oxygen level with correct unit.
- Pour the water sample into a beaker, use the pH meter to measure the pH value.
- Add 2-3 drops of water sample on the glass surface of the refractometer to measure the salinity.
- Weigh a filter paper taken out from the oven by an electronic balance. Filter 100-200ml water sample using Buncher Funnel and electric pump, then dry the filter paper in the oven for 30mins. Re-weigh the filter paper by the same balance. Calculate the amount of total suspended solids by the weight difference and the amount of water filtered.



Data sheet

Animals found inside quadrats:

Site A:

Animal names	Number of individuals		
	Quadrat 1 (near sea water)	Quadrat 2 (intertidal zone)	Quadrat 3 (splash zone)

Site B:

Animal names	Number of individuals		
	Quadrat 1 (near sea water)	Quadrat 2 (intertidal zone)	Quadrat 3 (splash zone)

Animals found outside quadrats:

Site A:

Animal names	Micro-habitat

Site B:

Animal names	Micro-habitat

Adaptation features of animals:

a. Preventing desiccation and/or overheat:

- i. _____ (e.g. _____)
- ii. _____ (e.g. _____)
- iii. _____ (e.g. _____)

b. Preventing predators :

- i. _____ (e.g. _____)
- ii. _____ (e.g. _____)
- iii. _____ (e.g. _____)

Plants and others:

Site A:

Plant names	Position

Site B:

Plant names	Position

Comparison of cyanobacteria, encrusting algae, erect algae and lichen

	cyanobacteria	encrusting algae	erect algae	lichen
Colour				
External features				
Growing morphology				

Features helping plants to withstand strong winds:

Features related to the growth of plants on the substratum deficient location:

Leaf features related to lack of freshwater environment:

Relationships between living organisms:

- i. _____ (e.g. _____)
- ii. _____ (e.g. _____)
- iii. _____ (e.g. _____)
- iv. _____ (e.g. _____)

Recent weather conditions: _____

Physical environment near field site: _____



Sketch map of Site A:

Sketch map of Site B:

Physical factors:

	General environment		Rock gaps		Rock pool		Shaded area		
	A	B	A	B	A	B	A	B	
Site									
Air temperature °C									
Relative humidity %									
Light intensity Lux									
Wind speed ms ⁻¹ & direction									

Water sample:

Dissolved Oxygen: _____

pH: _____

Water Salinity: _____

Total Suspended Solids: _____