Introduction of Developing and Using Virtual Fieldwork Materials to Conduct Virtual Fieldwork on Coastal Environments

簡介如何發展及利用虛擬實地考察教件進行海岸環境虛擬實地考察

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The skills and suggested learning activities

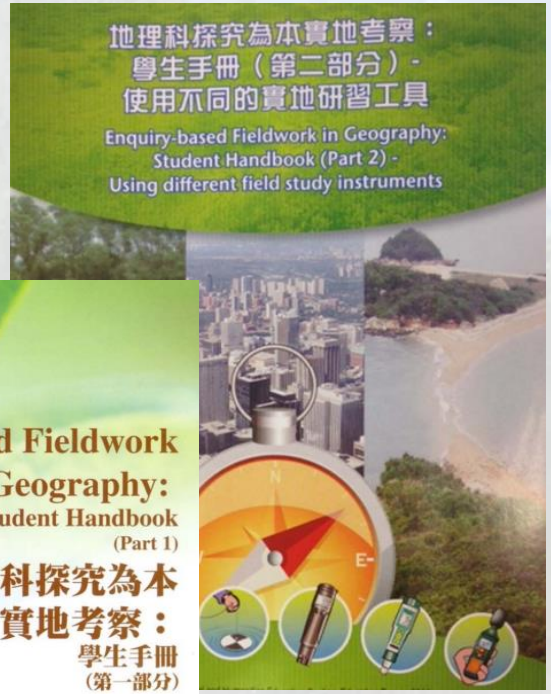
- Identify coastal features shown in maps.
- Construct annotated diagrams to illustrate the formation of coastal features.
- Use appropriate forms of presentation (e.g. tables, diagrams, statistical charts) to explain how coastal processes of erosion and deposition are influenced by various marine, atmospheric and geological factors.
- Use GIS, aerial photographs and/or satellite images to analyse the change of fluvial and coastal environments over time owing to human activities.
- Conduct a field visit to a river or a coastal area in Hong Kong to observe and identify the various management strategies implemented.
- Survey people's views on the management of river / coast in Hong Kong.

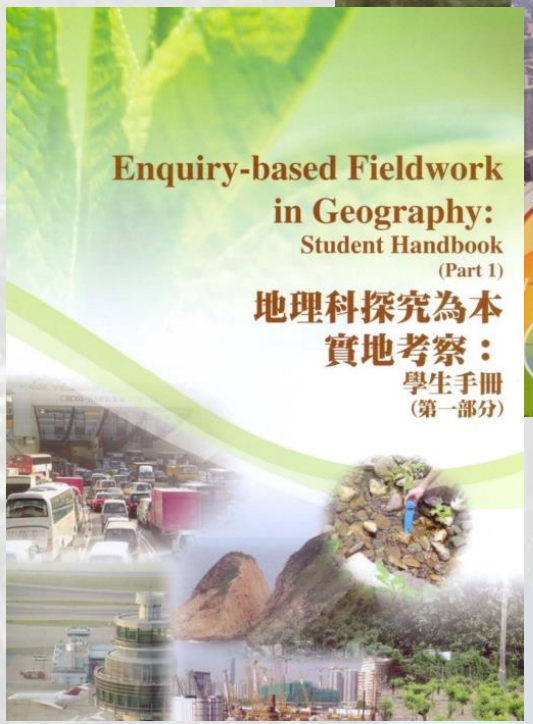
2. Managing River and Coastal Environments: A continuing challenge

This module aims at introducing how the work of fresh and sea water creates a variety of fluvial and coastal environments. Through the study of the work of water and the resulting landform features, students should be equipped with the basic understanding of the interaction of various physical factors in shaping the surface of our Earth, and the management issues that arise from increasing human interference in fluvial and coastal environments. Teachers should also aim at ensuring that students have a thorough understanding of the geographical concepts related to erosion, transportation and deposition, such that they can transfer and apply these concepts to the study of landform features in other environments.

Guiding Questions	Explanatory Notes	Concepts	Skills and Suggested Learning Activities
1. Where does water come from and go?	• A brief introduction of hydrological cycle: characteristics, stores and transfers	Hydrological cycle	• Draw a diagram of hydrological cycle to highlight the key components, including inputs, outputs, flows and stores.
2. How does water shape the landform in a drainage basin? 3. What are the major landform features created by the work of running water?	• Features of a drainage basin, including watershed, source, mouth, channel network • Major erosional, transportation and depositional processes • Factors influencing the above processes • Major landform features, including gorges, waterfalls and rapids, meanders and associated landform features, flood plains, levees, braids and deltas (using appropriate examples of the Mainland, e.g. Chang Jiang)	Drainage basin Fluvial process and landform	• Delimit the boundary of a river basin on a map. • Annotate photographs to describe the characteristics of the different parts of a river. • Draw cross-sections to illustrate the features of rivers.
4. How does water operate along coasts? 5. What are the major landform features created by the work of wave?	• Wave generation and characteristics (constructive and destructive waves) • Major erosion, transportation and deposition processes • Factors influencing the above processes • Major landform features, including sea cliff, sea cave, sea arch and stack, wave-cut platform, beach, spit and bar, tombolo	Coastal process and landform	• Identify coastal features shown in maps. • Construct annotated diagrams to illustrate the formation of coastal features. • Use appropriate forms of presentation (e.g. tables, diagrams, statistical charts) to explain how coastal processes of erosion and deposition are influenced by various marine, atmospheric and geological factors.
6. How do human activities influence river and coastal environments and what are the resulting consequences? 7. How does the management of river and coastal systems pose a continuing challenge for people?	• Human activities on river and coastal environments: e.g. drainage, reclamation and recreation • Impact and consequences: e.g. flooding, erosion and mass wasting, pollution, and disturbance / damage to the ecosystem • "Hard" and "soft" management strategies e.g. channelisation, building breakwaters, land use zoning, beach nourishment. • Management issues, including evaluation of methods and strategies used, and their possible impact	People-environment interaction Conflict Management	• Use GIS, aerial photographs and/or satellite images to analyse the change of fluvial and coastal environments over time owing to human activities. • Conduct a field visit to a river or a coastal area in Hong Kong to observe and identify the various management strategies implemented. • Survey people's views on the management of river / coast in Hong Kong.
Values and attitudes	• Appreciate the beauty of nature • Be aware of the changing nature of our physical environment and its possible impact on human activities • Recognise the need for sustainable management of our physical environment		

Introduction to the operation and uses of field study instruments in Geography





Fieldwork on

-river and coast

-green canopy

-weather

-geology & geomorphology

-agriculture

-urban areas

Conducting “actual” fieldwork on coast

Measuring Profile Gradient
- Measuring Tape (as a transect)
- Ranging Poles
- Abney Level/ Clinometer
- Ruler
- Level Meter

Measuring Swash / Backwash
- By Observation
- Swingometer

Measuring Longshore Drift
- By Observation
- Floats (Button, Bottle, etc.)
- Measuring Tape
- Ranging Poles
- Anemometer
- Compass
- Nylon thread
- Timer

Examining Sediment Sorting
- By Observation

Measuring Sediment Size
- Trowel
- Sampling Bottle
- Sand Sieves
- Crucible
- Oven
- Spatula

Measuring Sediment Roundness
- Vernier Calliper
- Radius Chart
- Cailleux Roundness Index

Measuring Sediment Shape
- 10X Magnifying Glass
- Power’s Scale of Roundness

Measuring Water Quality
- Turbidity Test
- pH Meter
- Thermometer
- Dissolved Oxygen Meter
- Salinity Meter
- E. coli Culture Disc

Can virtual fieldwork replace the actual fieldwork?

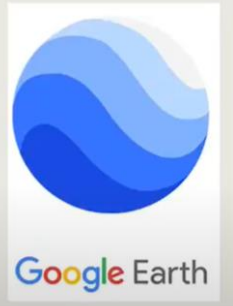
Benefits of virtual field trip

- not limited by distance / time
- more cost-effective
- fewer safety concerns
- create enriching, interactive experiences that cater to students of all learning styles and expose them to diverse perspectives

Apps or software

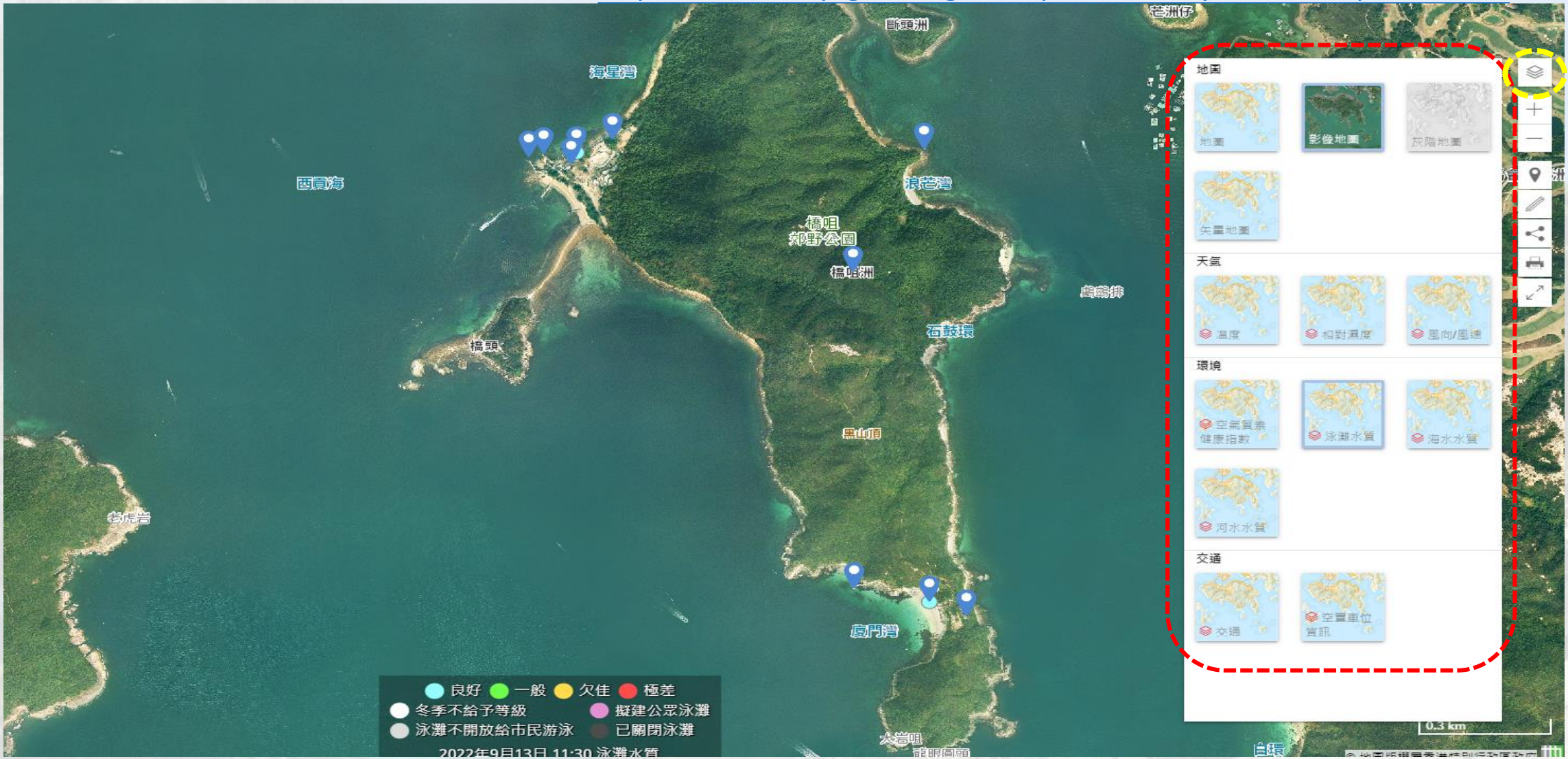
- Google Earth / Google Earth VR
- Google Street view
- Google my map
- Eduventure VR
- Roundme
- ArcGIS Story Map
- GEOINFO MAP

etc.

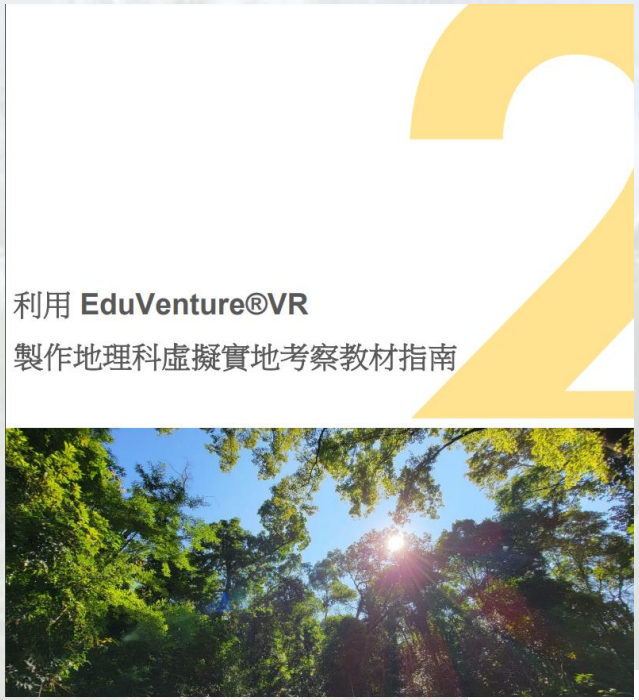


GEOINFO MAP

https://www.map.gov.hk/gm/map/search/keyword/Sharp%20Island



Eduventure VR



利用EduVenture®VR發展虛擬實地考察教件及錦田河個案研習

說明	閱覽或下載
地理科：錦田河虛擬實地考察 – 教師指引及課堂規劃	PDF
地理科：錦田河虛擬實地考察 – 實地考察工具及應用程式使用列表	PDF
地理科：錦田河虛擬實地考察 – 學生工作紙及數據記錄表	PDF
利用EduVenture®VR製作網上學與教材料指南	PDF

利用Roundme及 EduVenture®VR發展虛擬實地考察教件及大埔滘及其附近地區個案研習

說明	閱覽或下載
地理科：大埔滘及其附近地區虛擬實地考察 – 教師指引及課堂規劃	PDF
地理科：大埔滘及其附近地區虛擬實地考察– 實地考察工具及應用程式使用列表	PDF
地理科：大埔滘及其附近地區虛擬實地考察– 學生工作紙及數據記錄表	PDF
利用Roundme製作網上學與教材料指南	PDF

EduVenture-VR 系統由 香港中文大學 (CUHK) 學習科學與科技中心 (CLST) 設計，開發及管理。

Roundme

利用 **Roundme**

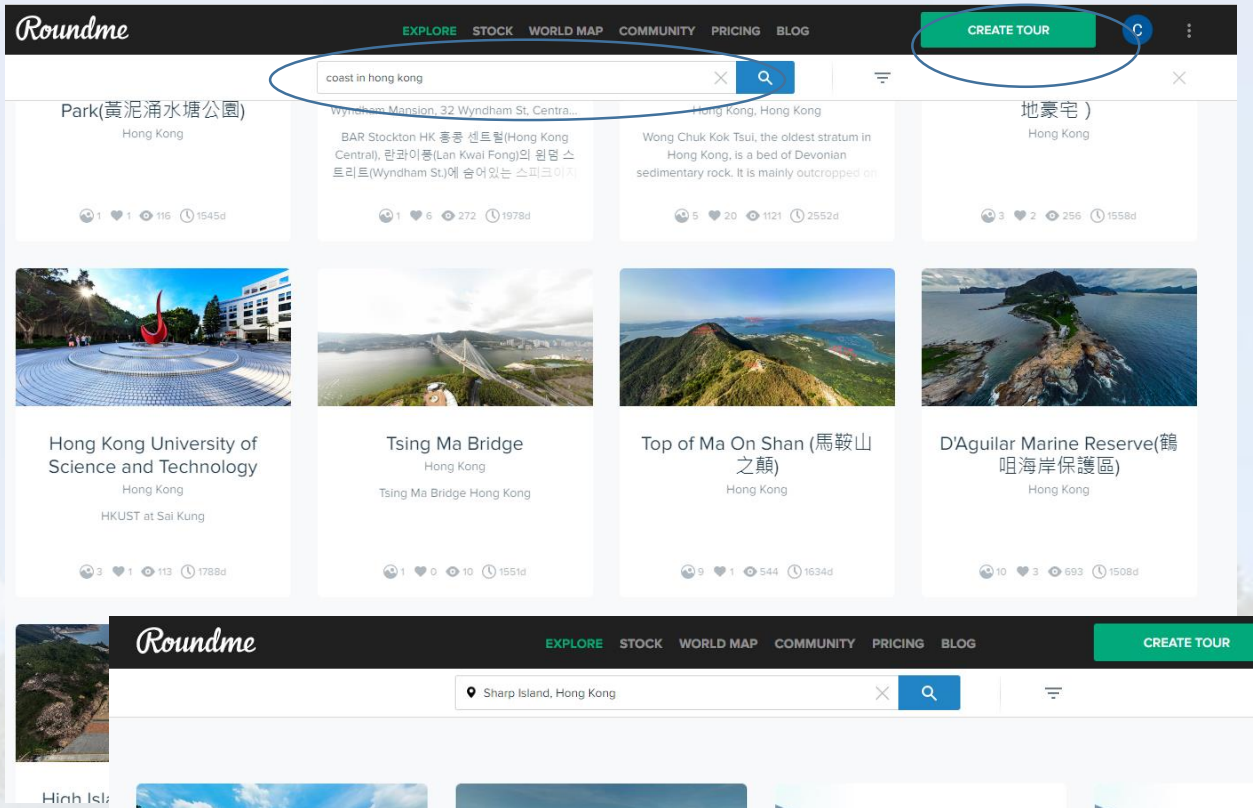
製作地理科虛擬實地考察教材指南

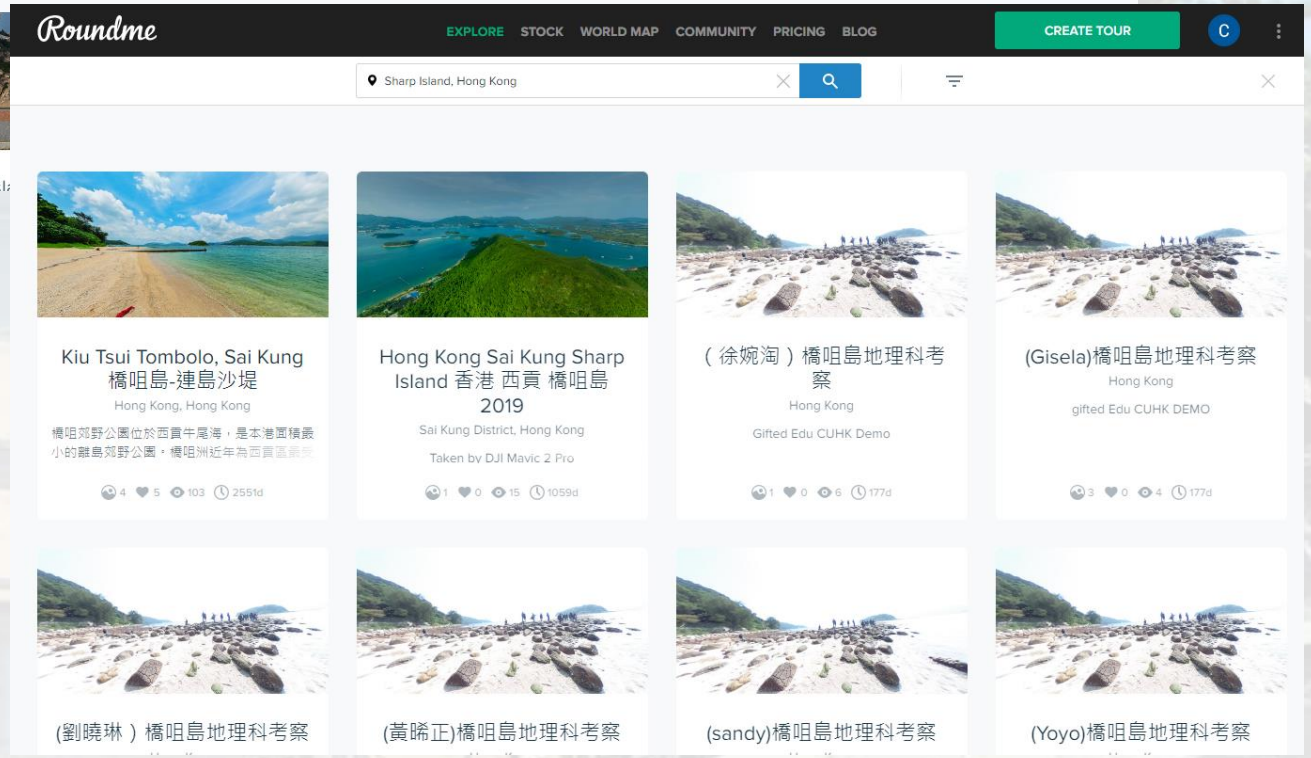
香港中文大學 學習科學與科技中心

教育局 課程發展處

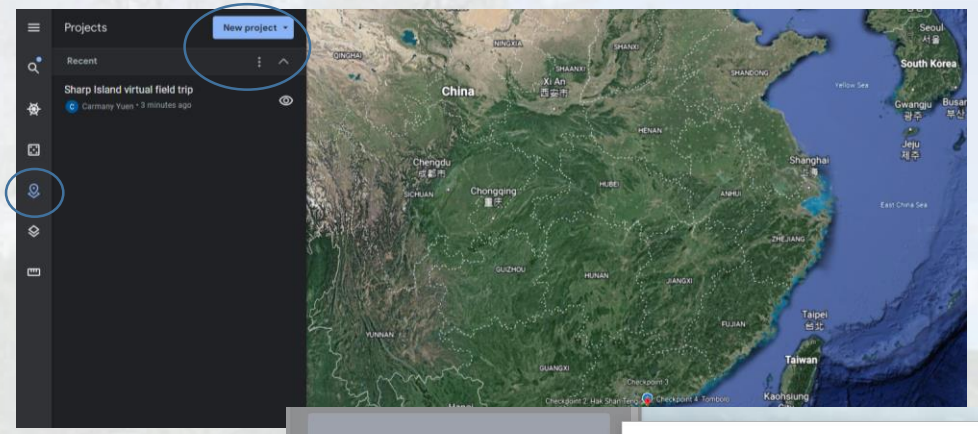
在地理科應用電子學習系列 (22)：

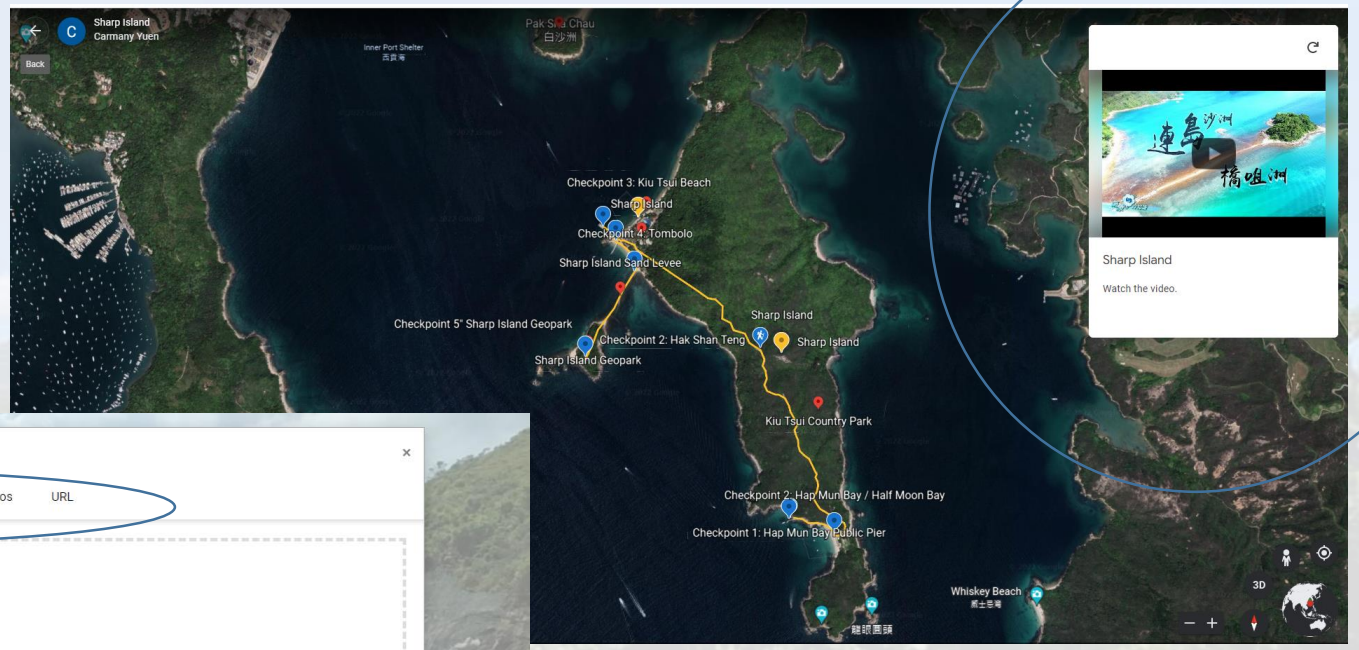
利用資訊科技發展地理科有關森林的虛擬實地考察材料工作坊(修訂)

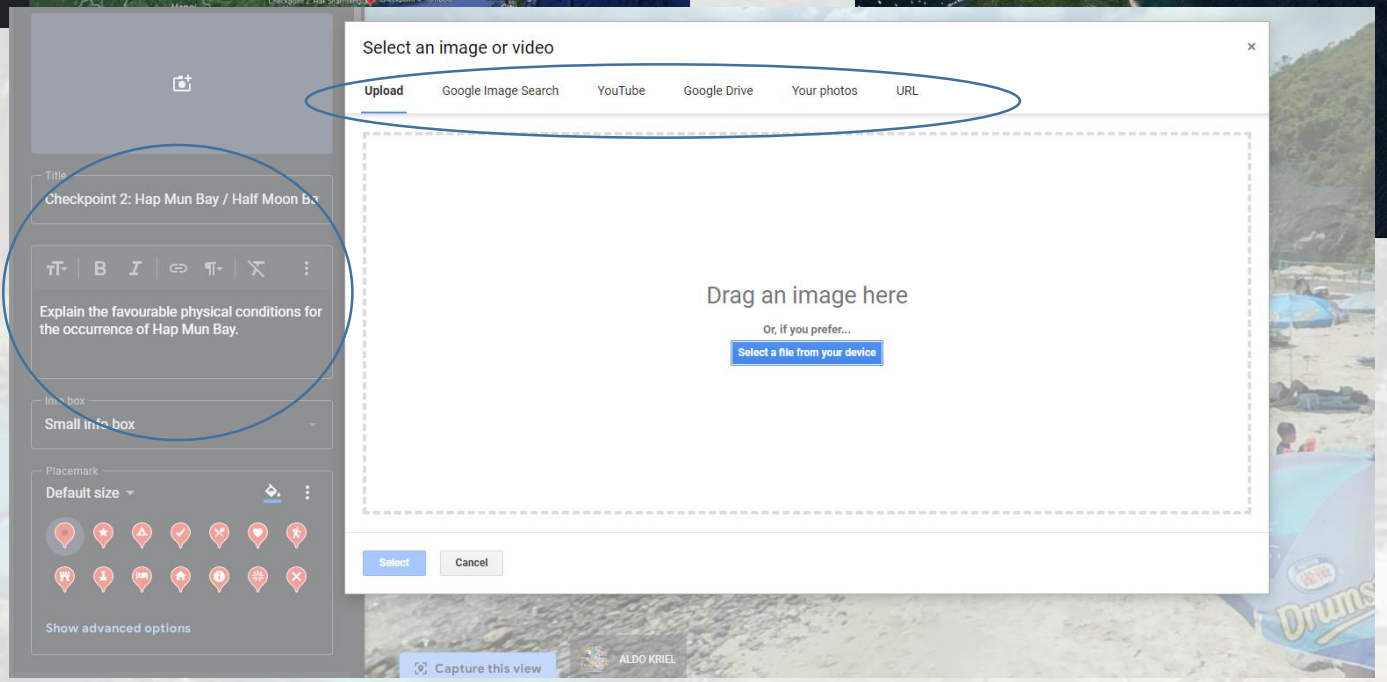




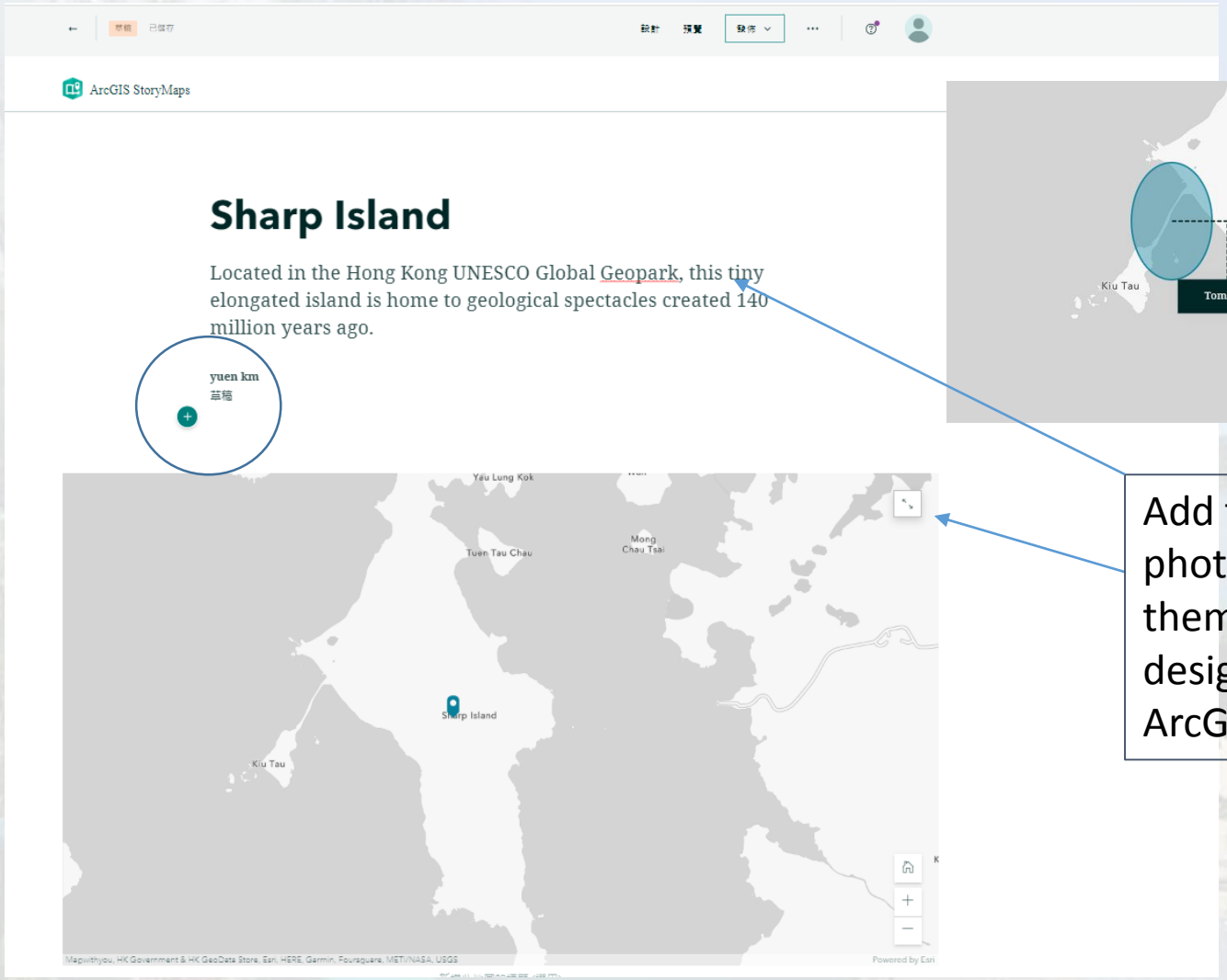
Google Earth

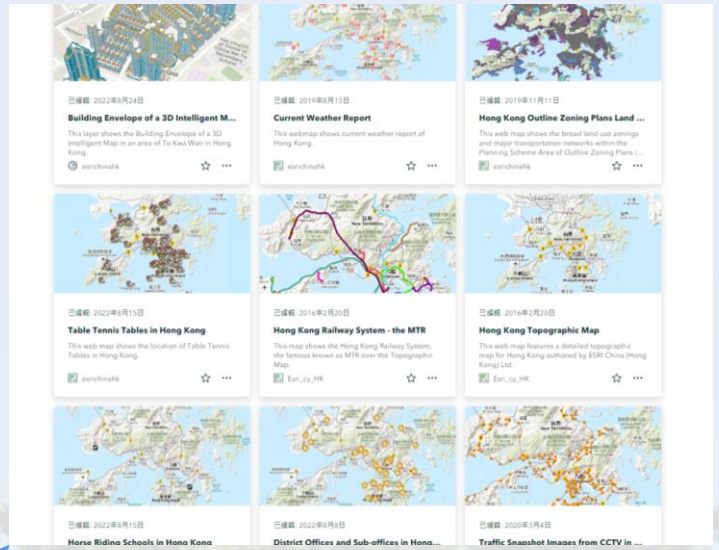






ArcGIS Story Map

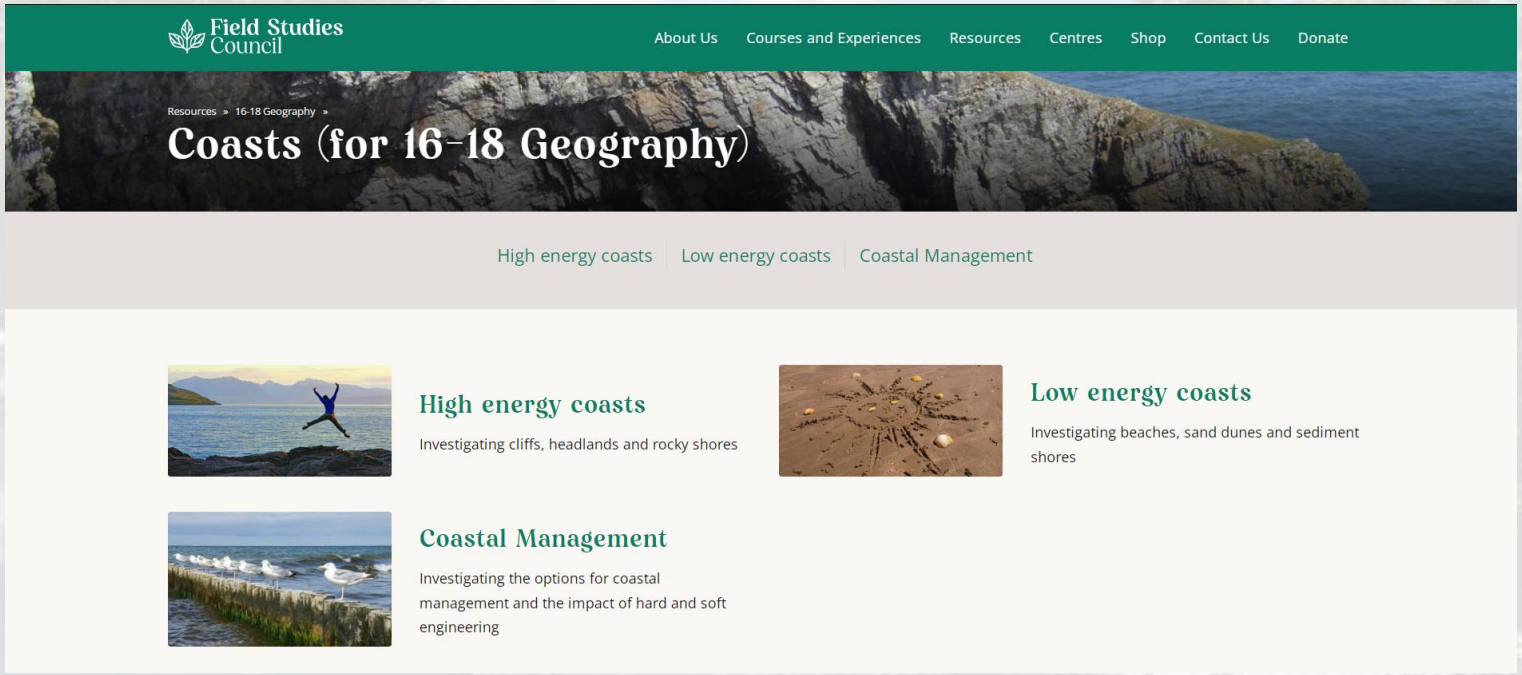




Add texts, maps, photos, videos, thematic map designed by ArcGIS

References for planning and carrying out fieldwork

- https://www.field-studies-council.org/resources/16-18-geography/




Thank you