

Agriculture, Fisheries and Conservation Department
The Education University of Hong Kong
Curriculum-based Outdoor Learning Programmes in Country Parks
Secondary 4-6 Geography: Coastal Environment and Geomorphology
Learning and Teaching Package

1. Overview

Agriculture, Fisheries and Conservation Department of Hong Kong (AFCD) entrusts the Department of Science and Environmental Studies of The Education University of Hong Kong with the development of curriculum-based outdoor learning programmes in country parks. This programme adopts context-based learning and project-based learning approaches, in accordance with the Geography Curriculum and Assessment Guide (Secondary 4 – 6), published by the Curriculum Development Council of Hong Kong Education Bureau and The Hong Kong Examination and Assessment Authority. It aims at cultivating students' geographical skills in exploring and understanding the relationship between human beings and the Earth, which enables students to further transfer the skills to other learning and life situations.

This outdoor learning programme consists of the following three learning stages:

1. Learning Stage (1): Pre-Trip Study
2. Learning Stage (2): Field Trip
3. Learning Stage (3): Post-Trip Study

2. Objectives

This programme aims at developing students' geographical thinking through the adoption of inquiry approach in coastal fieldwork. For knowledge, students are expected to develop knowledge and understanding of geographical concepts of coastal environment. With the acquisition of basic geographical concepts, students will be able to identify the interrelationship between the coastal environment and human activities. During the field trip, students are expected to develop geographical inquiry skills, which is the main focus of geographical fieldwork, with the purpose of cultivating students' ability in identifying and asking geographical questions, collecting and extracting data, using appropriate formats and techniques in presenting and analysing data and information, evaluating the findings and providing solutions. Meanwhile, generic skills including critical thinking and problem-solving skills will also be developed through geographical inquiry, with the hope that students will be able to transfer the skills to other learning and life contexts. Ultimately, students are expected to develop attitudes that will enable them to show respect to the nature and be aware of the increasing importance of conserving country parks for its sustainable development.

3. Catering for Diverse Learning Ability

In order to provide inclusive learning and teaching (L&T) content, teaching notes are categorised into three levels, namely **Level 1** (basic), **Level 2** (intermediate) and **Level 3** (advanced). These three levels refer to the level of difficulty for students to learn. Level 1 refers to the general content provided in the package without mentioning it as "Extended Knowledge". The content is basically related to the curriculum and fundamental coastal knowledge will be delivered, such as the knowledge of coastal processes and related landforms. At this level, teacher's role is significant in guiding students to follow. For Level 2, it is categorised as "Extended Knowledge **Level 2**". Content of this level is developed based on that of Level 1, meaning that after the acquisition of Level 1's knowledge, students may be able to explore the geographical concepts behind the generic knowledge. By doing this, students are

cultivated in developing the skills of applying the concepts to other discipline and real-life situations in understanding an issue. At this stage, teacher shall provide guidance for students but is advised to provide room for students to inquire. For Level 3, it is categorised as “Extended Knowledge Level 3”. At this stage, students are required to have self-directed learning. Teachers may select suitable level within the L&T package with reference to the students’ learning ability.

4. Guidelines on Outdoor Activities

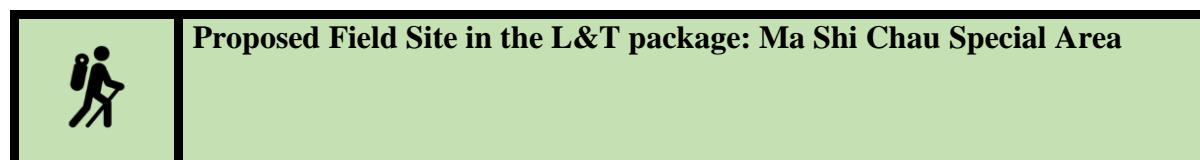
This L&T package adopts outdoor learning approach by engaging students in natural environment to conduct fieldwork. The safety of students should be the prime and foremost concern when conducting outdoor activities. The package indicates the time for rest between tasks, provides field guide and safety guide for student. Furthermore, the recommended site avoids slopes or steep footpaths. Schools should work out emergency measures and procedures. All participants, including teachers/instructors, should understand their responsibilities and the actions to take in the event of emergency. Schools should refer to the relevant circulars and guidelines of the Guidelines on Outdoor Activities issued by the Education Bureau. Please refer to: <https://www.edb.gov.hk/en/sch-admin/admin/about-activities/sch-activities-guidelines/index.html>.

5. Special Weather Arrangement

Teachers/Instructors should pay attention to weather forecasts/reports before and during the field trip and receive such information through television, radio, newspapers and mobile application and over the telephone. Fieldwork should be cancelled if:


- a) a tropical cyclone warning no. 1 or above is issued;
- b) a/an amber, red or black rainstorm warning is issued, or after the cancellation of the warning;
- c) a thunderstorm forecast/warning is issued;
- d) it is affected by other adverse weather conditions or uncontrollable factors posing potential safety risks; or
- e) The Education Bureau (EdB) announces the suspension of classes as a result of adverse weather conditions.



Therefore, clear and specific rules and regulations are laid down by institutions that organise outdoor activities, for example, safety measures to be taken during activities, and contingency plans to be activated in case of changes in weather conditions.






Stage 1: Pre-Trip Study: Coastal Environment in Hong Kong


| | |
|---------------------------------------|--|
| Target | F.4 – F.6 students |
| Subject and Related Chapter(s) | Geography: Managing River and Coastal Environments: A Continuing Challenge (Compulsory part) Theme: Coastal Environment |
| Teacher to Student Ratio | 1:18 |
| Time | 100 minutes |
| Learning Goals | <p>After joining the Pre-trip introduction, students will be able to:</p> <p>Knowledge</p> <ol style="list-style-type: none"> 1. Identify the coastal features 2. Examine the formation of coastal landforms/features 3. Explain how coastal processes of erosion and deposition are influenced by various marine, atmospheric and geological factors 4. Name and locate the country parks and special areas in Hong Kong <p>Skills</p> <ol style="list-style-type: none"> 1. Interpret a range of geographical information including maps or digital mapping 2. Practice coastal fieldwork data collection methods <p>Attitude</p> <ol style="list-style-type: none"> 1. Appreciate the beauty of nature in country parks and special areas 2. Foster their awareness about the unique and spectacular natural resources in country parks and special areas and recognise the need of conservation 3. Recognise the need for sustainable management of our physical environment |
| Teaching Materials | <ul style="list-style-type: none"> ● Teacher Handbook P.2-27 ● Map Extracts ● Google Earth |

| Part 1 Introduction of Fieldwork Inquiry Procedures | |
|---|--|
| Time | 10 minutes |
| Fieldwork inquiry procedures | <p>1. Before introducing the coastal field study, teacher should explain the fieldwork inquiry procedures to students in order to let students understand how a standard fieldwork inquiry should be conducted, which can be applied to all geographical topics</p> <ul style="list-style-type: none"> ● Fieldwork Inquiry Procedures* <ul style="list-style-type: none"> a. Planning and preparation b. Data collection c. Data processing, presentation and analysis d. Interpretation and conclusion e. Evaluation <p>(*Details refer to Teacher Handbook P.4)</p> |
| Part 2 The Background Information of the Study | |
| Time | 15 minutes |
| Review the knowledge of coastal environment | <p>2. Teacher reviews the knowledge of the coastal environment with students</p> <ul style="list-style-type: none"> ● Comparison between erosional and depositional coastal landforms <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p> E-learning Use of Mentimeter/Kahoot* to ask questions is recommended for the sake of enhancing teacher-student interaction</p> <ul style="list-style-type: none"> ● Mentimeter: https://www.mentimeter.com/ ● Kahoot: https://kahoot.it/ </div> <p>3. Review and explain the related geographical concepts to students. Remind the students to apply geographical concepts and knowledge in the fieldwork to interpret and analyse the issue to obtain a deeper understanding*</p> <ul style="list-style-type: none"> ● Coastal process and landform; People-environment interaction; Conflict; Management <p>(*Details refer to Teacher Handbook P.5-7)</p> |
| Part 3 Identification of Inquiry Questions | |

| | |
|--|--|
| Time | 15 minutes |
| Identification of inquiry questions | <p>4. Teacher sets the main theme of the fieldwork</p> <ul style="list-style-type: none"> ● Theme: Managing coastal environment/ The degree of human impact on coastal environment or other possible themes ● Use of five “Ws” to analyse the theme from a geographical perspective <ul style="list-style-type: none"> ◆ Five “Ws”: What; Why; How; Where; What if* <p>(*Details refer to Teacher Handbook P.6)</p> <p>5. Group activity</p> <p>I. Five “Ws”</p> <ul style="list-style-type: none"> ● Form a group of 4-5 persons. This grouping is also for conducting fieldwork ● Group discussion: Use five “Ws” to analyse the theme of the fieldwork ● After discussion, teacher should assist students to integrate what they have learnt with the geographical concepts <p>II. Inquiry question formulation</p> <ul style="list-style-type: none"> ● Based on the analysis of five “Ws”, the groups further formulate inquiry question(s) for the fieldwork* ● Introduction of Hypothesis setting <p>(*Details refer to Teacher Handbook P.10-11)</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p> Think Over: Are Your Inquiry Questions Appropriate? Teacher can assist students in critically evaluate the inquiry questions with the following criteria:</p> <ul style="list-style-type: none"> ● Geographical in nature; Clear focus; Practical; Realistic (*Details refer to Teacher Handbook P.10) </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p> Note to Teachers Teacher can refine the fieldwork activities with reference to students’ interest and ability</p> <p>Level 1 Teacher can provide more assistance by giving them the sample questions for thinking</p> <p>Level 3 Teacher can only provide the fieldwork inquiry framework in Part 1 to students and ask them to develop their own inquiry questions</p> </div> |

Part 4 The Background Information of Ma Shi Chau

| | |
|--------------------|--|
| Time | 15 minutes |
| Ma Shi Chau | <p>6. Coastal environment in country park and special areas of Hong Kong</p> <ul style="list-style-type: none"> ● Teacher can briefly explain the situations of coastal environment within country parks and special areas to students <ul style="list-style-type: none"> ◆ In Hong Kong, about 40% of the land is designated as Country Parks or Special Areas under the Country Parks Ordinance (Cap. 208). Coastal environment within the boundaries of these areas is conserved and protected from human activities and developments <p>7. Introduction of Ma Shi Chau</p> <ul style="list-style-type: none"> ● From location to place ● Physical setting; geology; coastal landforms; with map extracts provided <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p> Think Over: Why is Ma Shi Chau chosen to be the field site?</p> <p>Teacher can assist students in thinking about how to choose an optimal place for conducting fieldwork. The major criteria for it is listed below</p> <ul style="list-style-type: none"> ● Easy accessibility; Safe to visit; Provision of relevant data to answer the inquiry questions ● Ask students to suggest one potential risk* of undertaking fieldwork at coastal area (*Details refer to Teacher Handbook P.16) ● Ask students to suggest why Ma Shi Chau is an optimal field site to conduct coastal fieldwork </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p> Think Over: When is the optimal season/time for conducting fieldwork?</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p> Extended Knowledge: Hong Kong UNESCO Global Geopark</p> <p>Level 2</p> <p>Ma Shi Chau is one of the geosites of Hong Kong UNESCO Global Geopark. Teacher can explain the term “UNESCO Global Geopark” and the reasons of Ma Shi Chau being one of the geosites in Hong Kong to students for the sake of raising their awareness towards natural conservation</p> </div> |

| Part 5 Data Collection Methods | |
|---|--|
| Time | 40 minutes |
| Data collection methods | <p>8. Teacher introduces the coastal data collection methods to students</p> <ul style="list-style-type: none"> • Measurements include (1) beach profile; (2) sediment analysis; (3) longshore drift (*Details refer to Teacher Handbook P.18-25) <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p> E-learning</p> <p>If possible, teacher can provide students with smart tools from smart phones/tablets to conduct measurements to replace the traditional tools, for example:</p> <ul style="list-style-type: none"> • Smart Measure: measure the distance and height of a target • Smart Distance: measure the distance to a target • My Tracks: keep track of your routes when moving • Theodolite Droid: a multi-function augmented reality app which could provide real-time information about the position, altitude, inclination, etc. • My MapHK: provide detailed base map of Hong Kong published by Lands Department • Pros and Cons of using smart tools in fieldwork will be analysed in Teacher Handbook </div> <p>9. Explanation of common student errors</p> <ul style="list-style-type: none"> • Teacher shall explain the common errors which are expected to be made by students during coastal field study in order to avoid the students collect inappropriate data |
| Part 6 Things to Note for the Field Trip | |
| Time | 5 minutes |
| Conclusion and review | <ul style="list-style-type: none"> • Safety and things to bring • Wear water-friendly, non-slippery and toe-covering shoes (will get wet wading) • Bring sunblock lotion, windbreaker, umbrella, spare clothing • Stay away from exposed shores with strong waves • Check in advance the time and height of high and low |

| | |
|--|---|
| | <p>tides. It is recommended to carry out fieldwork at the coast when the tide is below 1.5 m (Chart Datum).</p> <ul style="list-style-type: none"> ● Be careful when students work close to the shoreline, should pay attention to slippery rock surfaces ● Students should stay with their respective groups |
|--|---|

Stage 2: Field Trip

| | |
|---------------------------------------|---|
| Target | F.4 – F.6 students |
| Subject and Related Chapter(s) | Geography: Managing River and Coastal Environments: A Continuing Challenge (Compulsory part) Theme: Coastal Environment |
| Teacher to Student Ratio | 1:18 |
| Time | 180 minutes |
| Learning Goals | <p>After the field trip, students will be able to:</p> <p>Knowledge</p> <ol style="list-style-type: none"> 1. Identify the features of coastal landforms 2. Investigate the relationship between beach profile, sediment size, shape and sorting 3. Examine how coastal processes shape the coastal environment <p>Skills</p> <ol style="list-style-type: none"> 1. Construct annotated diagrams to illustrate the formation of coastal features 2. Apply coastal fieldwork data collection methods 3. Apply accurate sampling methods in data collection 4. Develop teamwork with groupmates <p>Attitude</p> <ol style="list-style-type: none"> 1. Appreciate the beauty of nature in country parks and special areas 2. Be more aware of the unique and spectacular natural resources in country parks and special areas and recognise the need of conservation 3. Recognise the need for sustainable management of our physical environment |
| Teaching Materials | <ul style="list-style-type: none"> ● Teacher Handbook pp.30-52 ● Student Handbook P.6-20 ● Maps ● Abney level ● Measuring tape (50m) ● Ranging poles ● Compass |

| | |
|---------------------------------------|---|
| | <ul style="list-style-type: none"> ● Calliper ● Float (e.g. tennis balls) ● Quadrat ● Clipboard ● Gloves (in pairs) (optional) ● Sediment Ruler (Appendix A) |
| Part 1 Introduction and Review | |
| Time | 20 minutes |
| Review what has been learnt | <ol style="list-style-type: none"> 1. Revision <ul style="list-style-type: none"> ● Teacher can refresh students' memory about the measurements of coastal data collection methods and related common errors that students may make ● Teacher can review the inquiry questions of the fieldwork at Ma Shi Chau and the related measurements for collecting data 2. Preparation and distribution of materials <ul style="list-style-type: none"> ● Safety: Teacher shall remind students to follow the rules and instructions strictly. They shall pay attention to safety ● After arriving at the starting point of the field site, teacher shall distribute the data collection materials to each group |
| Part 2 Data Collection | |
| Time | 110 minutes |
| Data collection | <ol style="list-style-type: none"> 3. Teacher can instruct students to observe and record the time and location of collecting data at the field site 4. Activity 1: Identification of coastal landforms <ul style="list-style-type: none"> ● Observe the coastal environment and identify any erosional and depositional coastal landforms ● Draw annotated diagrams to illustrate the formation of the landforms 5. Activities 2-4: Data collection at the field site <ul style="list-style-type: none"> ● Teacher shall remind students not to pollute the coastal environment, litter and vandalise natural features. Students should follow strictly the countryside and safety code provided by AFCD ● Each group takes the equipment required for |

| | |
|--------------------------------|--|
| | <p>conducting the following measurements:</p> <ul style="list-style-type: none"> ◆ Beach profile ◆ Sediment analysis – particle size, roundness and sorting ◆ Longshore drift <ul style="list-style-type: none"> ● Students shall record and analyse the results on the record sheet provided in the Student Handbook |
| Part 3 Human activities | |
| Time | 30 minutes |
| Human activities | <p>6. Activity 5: Human activities on beaches</p> <ul style="list-style-type: none"> ● Identify any human activities that may pose a threat on coastal environment at the field site ● Provide suggestions to remedy the negative impacts of human activities <p>7. Activity 6: Geomorphology at Ma Shi Chau</p> <ul style="list-style-type: none"> ● Identify unique geomorphologic landforms in Ma Shi Chau along the fieldwork process, and fill in the worksheet ● More details and the formations of different geomorphologic landforms will be discussed in the post-trip lesson |
| Part 4 Conclusion | |
| Time | 10 minutes |
| Conclusion | <p>8. Fieldtrip conclusion</p> <ul style="list-style-type: none"> ● Students shall answer the inquiry questions stated in the fieldwork worksheet with reference to the primary data collected during the field study and make appropriate conclusion |

Stage 3: Post-Trip Study: Fieldwork Evaluation

| | |
|---------------------------------------|--|
| Target | F.4 – F.6 students |
| Subject and Related Chapter(s) | Geography: Managing River and Coastal Environments: A Continuing Challenge (Compulsory part) Theme: Coastal Environment |
| Teacher to Student Ratio | 1:18 |
| Time | 30 minutes |
| Learning Goals | <p>After the Post-Trip Study, students will be able to:</p> <p>Knowledge</p> <ol style="list-style-type: none"> 1. Identify geological features in Ma Shi Chau Special Area and describe their formations 2. Explore the people-environment interaction 3. Examine and evaluate the process of conducting a coastal field investigation <p>Skills</p> <ol style="list-style-type: none"> 1. Evaluate the sampling strategies and data collection methods 2. Evaluate the effectiveness of doing fieldwork in team <p>Attitude</p> <ol style="list-style-type: none"> 1. Recognise the fragility of the nature and the needs of conservation 2. Be aware of the changing nature of our physical environment and its possible impact on human activities 3. Recognise the need for sustainable management of our physical environment |
| Teaching Materials | <ul style="list-style-type: none"> ● Teacher Handbook p.53-57 ● Student Handbook p.21 |
| Part 1 Fieldwork Evaluation | |
| Time | 15 minutes |
| Fieldwork evaluation | <ol style="list-style-type: none"> 1. Teacher should guide the students in critically evaluate the coastal field investigation* with reference to: <ul style="list-style-type: none"> ● The accuracy and precision of the sampling strategies and data collected ● Student suggesting ways to improve/ minimise the |

| | |
|--|--|
| | <p>potential errors (*Details refer to Teacher Handbook P.54)</p> |
| Part 2 Geomorphology at Ma Shi Chau | |
| Time | 10 minutes |
| Understanding different unique geomorphologic landform features | <p>2. Teacher asks student to match the correct description of formations of these landforms (A-E) with the provided geomorphologic landforms:</p> <ul style="list-style-type: none"> ➤ Kink-band structure ➤ Quartz vein ➤ Weathering ➤ Differential erosion ➤ Faults |
| Part 3 Conclusion | |
| Time | 5 minutes |
| Conclusion | <p>3. Summary</p> <ul style="list-style-type: none"> ● Review the ways to evaluate coastal field study |