

THE CHINESE UNIVERSITY OF HONG KONG

Micro-Module Courseware Development Grant

Scheme 2: Studies in Foundation Courses

Final Report (2016-17)

Report due 30 April 2018

Please return by email to The Ad hoc Committee on Planning of eLearning Infrastructure
mmcd@cuhk.edu.hk

PART I

Project title: Production and Application of Micro-modules in Geophysics

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Department / Unit: Earth System Science Programme (ESSC)

Project duration: From May 2017 to April 2018

Date report submitted: 2018 April 2018

1. Project objectives

Is the project on track to meet its objectives?

Have the objectives been changed as a result of the experience of working on your MMCDG project?

(1) Our first objective is to produce a new micro-module to help students improve their skills on identifying rocks and minerals by means of multi-media tools. All activities conducted, as well as the current outcomes, strictly meet this objective. We have produced and enriched “**Rocks and Minerals Galley**” serving as a database that contains high quality photos of the rock and mineral samples in our unit’s laboratory Science Center 331, with annotation. This digital resource is very much more approachable for students than those physical ones in the laboratory, and can be easily accessed by visiting the website: <https://cuhkesscelearn.wixsite.com/home/rocks-minerals>. In addition, two “**KEEP courses Petrology and Volcanoes**” (<https://cuhkesscelearn.wixsite.com/home/keep-courses>) have been created and are

available for students to play a mini game, answer questions about rocks and minerals and understand related topics. **A free online app Kahoot and Flipped Classroom** with questions about volcanoes was used as a learning game for students in ESSC2010, followed by **a case study of Mt. Aso**. The gallery, the KEEP courses, the Kahoot mini game and the Flipped Classroom serve as a supplementary e-learning materials for students studying the programme courses ESSC1000, ESSC2010 and ESSC2110 as planned. Students enrolling in courses ESSC2120, ESSC3100, ESSC3110, ESSC4120 and ESSC4130 can also benefit from the materials. The KEEP courses “Petrology” and “Volcanoes, the Kahoot mini game and the Flipped Classroom are additional outcomes after the “Rocks and Minerals Gallery”.

(b) The second objective is to greatly extend our Earth System Science classroom teaching through virtual geological field trips. **Educational videos** have been shot to help students better understand the topic of Geology in Hong Kong and Taiwan. After interim evaluation in October 2017, we realized (1) the difficulties in knowledge difference between our unit and the outside shooting and animation company, and (2) richer Taiwan geological contents than we expected. We decided to change our plan a bit by reducing local field shooting and animation but spending more time to edit the Taiwan geological contents. Currently, we have produced a total of **32 local geological videos** and **18 Taiwan geological videos** (each of 1-4 minutes long). The change does not only meet the second objective (producing five episodes of Hong Kong Geological Virtual Field Trip), but it also additionally develops a greater variety of the contents in Taiwan Geological Virtual Field Trips. At the same time, as more student helpers are involved in the field shooting and production, this enhance their self-learning ability. Furthermore, we have also provided an engaging way to get students feedback. A **KEEP course “Hong Kong Geology”** has been launched and incorporated into a junior course ESSC1000. With this platform, we designed various forms of questions. It is also expected to collect some data about students' performance from KEEP for our future pedagogical research.

2. Process, outcomes or deliverables

Please specify the number of micro modules produced, and the course(s) (with course codes and titles) that have used the micro modules in Part IV, and provide more detailed descriptions here. Must specify duration of each micro-modules (in terms of students online contact hours), total duration time of all deliverables and style. (With reference to the "[Summary of video presentation styles](#)" developed by CLEAR)

Has the nature of the deliverables been changed?

Have you adjusted your timeline?

Overall, was the project completed satisfactorily?

A new platform (<https://cuhkesscelearn.wixsite.com/home>) with all of our e-learning products to promote ESSC has been generated. All the materials are reorganized and grouped into FOUR major categories with different means of activities carried out. So as to promote ESSC and science for the public, it is defined as a resource pool, in which data can be used for CUHK Open Day, Information Day, school talks, school visits, summer courses and other outreach materials for high schools and the public. Rocks and Minerals Gallery, Virtual Geological Field Trips (Hong Kong and Taiwan) and KEEP courses Petrology and Geology are partly supported by this fund.

Micro-Module (1) : Rocks and Minerals Gallery [Link]

Large number of high quality photos/micrographs has been taken for hand specimens (using Canon PowerShot SX60 HS) and thin sections (using the Nikon H550S and camera system) of the rock samples in our lab. 244 photos were selected and annotations are added to generate an online database for various courses. It is also an important resource pool for developing other online earth science courses for blended learning. Below shows detailed activities for the production:

(1) High resolution photos have been taken for each of our rocks and minerals samples, including three main types of rocks (igneous rock, metamorphic rock and sedimentary rock) and two main types of minerals (transparent mineral and metallic mineral). Detailed annotation for each rock photo has been added mainly based on the reference book "A Dictionary of Geology and Earth Sciences (4 ed.), Oxford University Press".

(2) In addition to the digitalisation of hand specimen, typical micrographs have been taken using the petrographic microscope and the camera system for each of our

petrographic thin sections. Micrographs can clearly show the physical characters of the common rock-forming minerals under PPL (plane polarised light) and XPL (cross-polarised light). Besides, these micrographs could also help students better understand rocks textures from the microscopic aspect, such as the differences among the phaneritic, aphanitic, and porphyritic textures of igneous rocks; the forming of foliated textures of the metamorphic rocks, etc. Both the sample photos and the thin section micrographs have played an important role in our digital resource pool. Detailed annotation for each micrograph has been added based on the work of our student helpers.

(3) A [website](#) to integrate all digital resources from our unit has been built, where the Rocks and Minerals Gallery and the Minerals in Thin Sections are two important components. The **mouse-over function**, which is easy-to-use, free and stable, is used to showcase our sample photos and thin section micrographs, which are carefully arranged in order to assist the syllabus of the petrology course. Students now can use the 24/7 self-service online to approach those limited resource in the lab no matter where they are.

(4) The successful development of the digital resource cannot be achieved without our student helpers team. A team of 10 senior students who have taken the petrology course (ESSC4120) worked for this micro-module for three months. They had extra time, compared with other peers, to work with rocks, minerals and microscopes. Adept skills in identifying rocks and minerals are required, therefore, regular discussions between student helpers and teaching or teaching supportive staff were spontaneously encouraged.

Module Summary

Products Produced :

- (1) high resolution rock samples photos with detailed annotation
- (2) micrographs of petrographic thin sections with detailed annotation
- (3) Webpage: Rocks and Minerals Gallery [\[link\]](#)

Total Estimated Duration Time : 4 Lab sessions involved (already tried)
(Self-paced study for afterclass review)

Video Presentation Styles : N/A (Photos are produced here)

Course(s) involved*: ESSC1000, ESSC2010, ESSC2120, ESSC3100,
ESSC3110, ESSC4120 and ESSC4130

*Note: Students of * can view the materials of related topics anytime after the class.*

Here is an example of the high resolution photos:

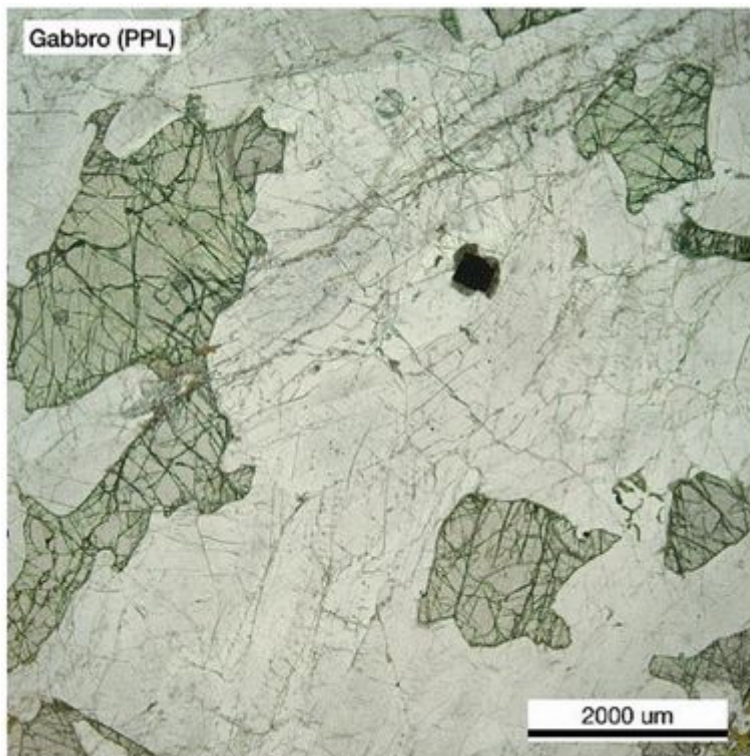
Gabbro

A coarse-grained, basic igneous rock, consisting of essential calcium-rich plagioclase feldspar (approximately 60%), clinopyroxene (augite or titanite), and orthopyroxene (hypersthene or bronzite), plus or minus olivine with accessory magnetite or ilmenite. Gabbros result from the slow crystallization of magmas of basaltic composition, and like the basalts they can be divided into tholeiitic and alkali types. Tholeiitic gabbros are characterized by the presence of two pyroxene types (augite and hypersthene) and interstitial silica-rich glass, whereas alkali gabbros are characterized by one calcium/titanium-rich pyroxene (titanite) and scattered interstitial feldspathoid minerals. Many large gabbroic intrusions display mineral layering, testifying to the complex processes taking place within basic magma chambers. Gabbros are commonly found intruded as ring complexes (e.g. Ardnamurchan and Skye in Scotland), large lopoliths (Bushveld complex, S. Africa), or layered complexes (Skaergaard in eastern Greenland being the most famous). — A Dictionary of Geology and Earth Sciences (4 ed.), Oxford University Press



size: around 8 cm

Here is an example of thin section micrographs (please note the mouse-over function):



See XPL microgram on mouseover.

GABBRO

Gabbro is a mafic intrusive igneous rock, which is coarse grained because of the slow cool down process. This also infers that Gabbro is possibly formed in a magma chamber underground such that the time for crystallisation is longer. In the specimen, most of the minerals are in large, blocky shape. Under XPL, pyroxene shows a sharp interference colour (3rd-4th order). On the other hand, there are relatively more abundant plagioclase, which shows yellow, white and grey interference colour. Albite twinning is common in plagioclase. - Eugenia Lai

[Micro-Module \(2\) : Virtual Geological Field Trip \(Hong Kong\) \[Link\]](#)

Three whole-day pre-filming field investigations and two whole-day field shootings were conducted. Six sites were studied, including Po Toi Island, Bluff Head, Tung Ping Chau, High Island, Lai Chi Chong, Ma Shi Chau, but only the first five (Po Toi Island, Bluff Head, Tung Ping Chau, High Island, Lai Chi Chong) were suitable and selected to be the filming locations. Together with the existing materials, the newly shot materials were edited with footages to produce a total of 32 videos, each of 1-3 minutes long. They are used as pre-trip tutorials for various courses. Large number of photos with geological features was taken as teaching materials.

Module Summary

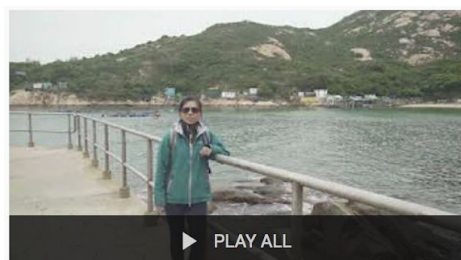
Products Produced :	32 videos
Total Estimated Duration Time :	48 mins in total
Video Presentation Styles :	Introduction videos of geological features
Course(s) involved*:	ESSC1000, ESSC2010 and ESSC3100

*Note: Students of * can view the materials of related topics anytime after the class.*

Virtual Geological Field Trip – Hong Kong:

Five field study videos about Po Toi Island, Bluff Head, Tung Ping Chau, High Island, Lai Chi Chong:

Po Toi Island:









Virtual geological field trips - Hong Kong

32 videos • 73 views • Last updated on 12 Apr 2018

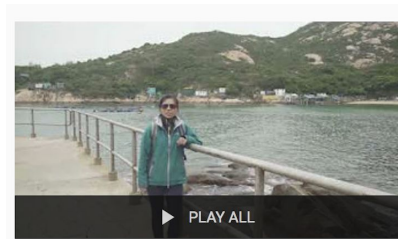


ESSC CUHK

SUBSCRIBE 25

- 1  **1.1 ESSC VGFT Ep1 Po Toi Part1 Introduction**
ESSC CUHK 1:17
- 2  **1.2 ESSC VGFT Ep1 Po Toi Part2 Minerals in granite**
ESSC CUHK 2:08
- 3  **1.3 ESSC VGFT Ep1 Po Toi Part2 Pegmatite**
ESSC CUHK 2:32
- 4  **1.4 ESSC VGFT Ep1 Po Toi Part4 Weathering product of granite**
ESSC CUHK 1:00
- 5  **1.5 ESSC VGFT Ep1 Po Toi Part5 Cross-cutting rock units**
ESSC CUHK 3:24
- 6  **1.6 ESSC VGFT Ep1 Po Toi Part6 Unloading joints**
ESSC CUHK 2:38

Bluff Head:











Virtual geological field trips - Hong Kong

32 videos • 73 views • Last updated on 12 Apr 2018

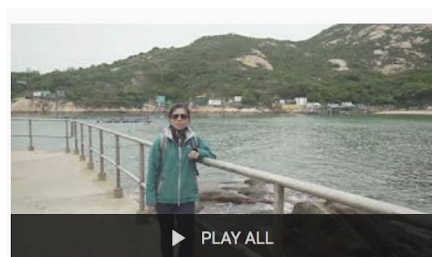


ESSC CUHK

SUBSCRIBE 25

- 7  **2.1 Bluff Head Background**
ESSC CUHK
- 8  **2.2 Bluff Head Vertical Bedding**
ESSC CUHK
- 9  **2.3 Bluff Head Devil's Fist**
ESSC CUHK
- 10  **2.4 Bluff Head Cross Bedding**
ESSC CUHK
- 11  **2.5 Bluff Head Flowing Direction**
ESSC CUHK
- 12  **2.6 Bluff Head Layers Overturned**
ESSC CUHK
- 13  **2.7 Bluff Head Slickenside**
ESSC CUHK
- 14  **2.8 Bluff Head Fold**
ESSC CUHK

Tung Ping Chau:






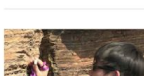

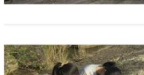
Virtual geological field trips - Hong Kong

32 videos • 73 views • Last updated on 12 Apr 2018

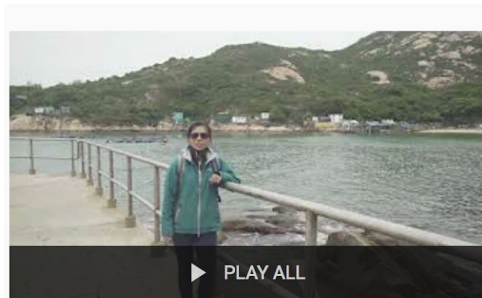


ESSC CUHK

SUBSCRIBE 25

- 15  **3.1 Tung Ping Chau Oldest Sedimentary Rocks in HK**
ESSC CUHK
- 16  **3.2 Tung Ping Chau Aerial**
ESSC CUHK
- 17  **3.3 Tung Ping Chau Introduction**
ESSC CUHK
- 18  **3.4 Tung Ping Chau Siltstone**
ESSC CUHK
- 19  **3.5 Tung Ping Chau Wave Cut Platform**
ESSC CUHK
- 20  **3.6 Tung Ping Chau Chert**
ESSC CUHK

High Island:










Virtual geological field trips - Hong Kong

32 videos • 73 views • Last updated on 12 Apr 2018

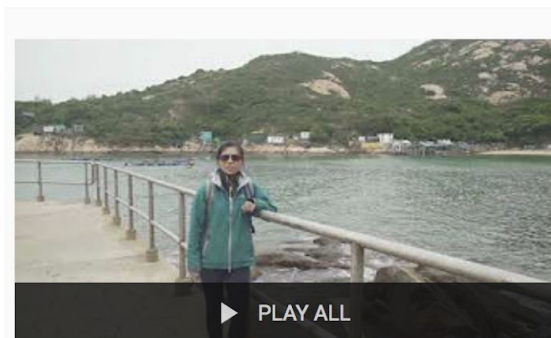


ESSC CUHK

SUBSCRIBE 25

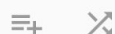
- 21  **4.1 High Island Introduction**
ESSC CUHK 1:21
- 22  **4.2 High Island Hexagon Column**
ESSC CUHK 2:31
- 23  **4.3 High Island Why Is It So Special?**
ESSC CUHK 1:10
- 24  **4.4 High Island Tilted Columns**
ESSC CUHK 0:59
- 25  **4.5 High Island Dyke**
ESSC CUHK 2:36
- 26  **4.6 High Island Fault Breccia**
ESSC CUHK 1:42
- 27  **4.7 High Island Sea Cave**
ESSC CUHK 1:42

Lai Chi Chong:








Virtual geological field trips - Hong Kong

32 videos • 73 views • Last updated on 12 Apr 2018



ESSC CUHK

SUBSCRIBE 25

- 28  **5.1 Lai Chi Chong Aerial**
ESSC CUHK 1:03
- 29  **5.2 Lai Chi Chong Load Cast**
ESSC CUHK 0:59
- 30  **5.3 Lai Chi Chong Oxidation**
ESSC CUHK 0:35
- 31  **5.4 Lai Chi Chong Slump Fold**
ESSC CUHK 0:45
- 32  **5.5 Lai Chi Chong Geological History**
ESSC CUHK 1:13


[Micro-Module \(3\) : Virtual Geological Field Trip \(Taiwan\) \[Link\]](#)

The videos are showing geological features running through Taiwan from the south to the north, including Hengchun, Liji Badland, Taitung, Ruisui, Hualian, Taroko, Hehuanshan, Jinguashi and Yehliu. All these 18 videos, each with 1-4 minutes, will be used as teaching materials in pre-trip lectures of ESSC2120, with explanation from the teacher in the class.

Note: Further edition of those videos with annotation are suggested for future self-study tutorials.

Module Summary


Products Produced :	18 videos (class explanation needed)
Total Estimated Duration Time :	24 minutes
Video Presentation Styles :	Introduction videos of Taiwan geology
Course(s) involved :	ESSC2120



全部播放


Uploads from ESSC CUHK


73 个视频 · 1次观看 · 今日更新





ESSC CUHK


订阅 25


- 


07小野柳
ESSC CUHK
1:05
- 

10石梯坪
ESSC CUHK
1:26
- 

09奇美斷層
ESSC CUHK
0:59
- 

12石門山步道
ESSC CUHK
4:30
- 

18陰陽海
ESSC CUHK
1:14
- 

06利吉惡地
ESSC CUHK
1:46
- 

17黃金瀑布
ESSC CUHK
0:57



Uploads from ESSC CUHK

73 个视频 · 1次观看 · 今日更新



ESSC CUHK

订阅 25



Uploads from ESSC CUHK

73 个视频 · 1次观看 · 今日更新



ESSC CUHK

订阅 25

15



04 風吹砂

ESSC CUHK

16



05 佳樂水

ESSC CUHK

17



01 貓鼻頭

ESSC CUHK

18



02 白沙灣

ESSC CUHK

8



16 野柳

ESSC CUHK

9



14 稚暉橋

ESSC CUHK

10



15 三貂角

ESSC CUHK

11



13 松雪樓

ESSC CUHK

12



03 出火

ESSC CUHK

13



11 燕子口步道

ESSC CUHK

14





08 玉里大橋

ESSC CUHK

[Micro-Module \(4\) : KEEP courses \[Link\]](#)


Three KEEP courses are developed:





Earth System Science Programme
e-Learning Resource Pool

Go to the Official Website of ESSC

HomeVideo ResourceRocks & Minerals GalleryKEEP CoursesInteractive ModulesAbout us

[Volcanoes](#) *(click here to start)*

[Petrology](#) *(click here to start)*

[HK Geology](#) *(click here to start)*

(1) [Petrology](#)

This private online course is aimed to provide supplementary material for curriculum senior course ESSC4120. Introduction of world's geological features and short questions are designed to assist students for better understanding petrological knowledge, as well as to master the critical geological skills, such as to distinguish minerals in thin sections and to identify rocks in hand specimen. Students can study “Rocks & Minerals Gallery” at the same time to enhance the knowledge and skills.

KEEP CourseESSC4120: PetrologyHelpPY Pui Yuk

View this course as: Staff

HomeCourseDiscussionWikiProgressInstructor

Petrology

Search the courseSearchResume Course

PETROLOGY

A short introductionResume Course

Igneous petrology

Sedimentary petrology

Metamorphic petrology

MINERAL OPTICS

Fundamentals

Mineral properties in plane-polarised light (PPL)

Mineral properties in cross-polarised light (XPL)

Common rock-forming minerals

PETROLOGY CASE STUDIES

Taiwan (Igneous rocks)

Wutai Shan, China (Metamorphic rocks)

Grand Canyon, U.S. (Sedimentary rocks)

Course Tools

Bookmarks

Important Course Dates

Course End
5 months ago - Dec 4, 2017
This course is archived, which means you can review course content but it is no longer active.

Today is Apr 30, 2018 13:43 HKT

Introduction of world's geological features:

View this course as: Staff ▾[Home](#) [Course](#) [Discussion](#) [Wiki](#) [Progress](#) [Instructor](#)[Course](#) > [PETROLOGY](#) > [A short introduction](#) > Fantastic rocks and where to find them[< Previous](#)[Next >](#)

Fantastic rocks and where to find them

[View Unit In Studio](#)[Bookmark this page](#)

--- Remember to answer the MC question at the end. ---

Before we go further to discuss the classifications and the mineralogical and geochemical properties of rocks, let's review some fantastic rocks around the world.

Some of them have become the famous tourist attractions and you may already know them if you traveled and saw rocks. I hope you could travel around and see more rocks in your future geological adventure. But when you do so, remember to ask yourself "What kind of rocks are there?" and "Why are they there?"

Firstly, let's take a look at some famous limestones in the world (*see the pictures below*).

"Limestones and dolomites are carbonate rocks that make up 10% to 15% of sedimentary rocks by volume."

Located at the Victoria's coast, the 12 Apostles (limestone sea stacks) were carved by the harsh winds and waves. They set an example of the coastal erosion, which is particularly common for limestones due to their major chemical compositions (CaCO_3). Limestones commonly formed in shallow marine water and hence very common to be found along the coastlines in the world.

Another good place to see the limestone pillars, arches and caves is the Halong Bay in Vietnam. However, not only along the coastlines can limestones be found, but they also crop out in some inland areas, such as the Yunnan province of P. R. China, where is famous for the Stone Forest. (Now think about: why can limestone that commonly formed in marine environment be found inland?)



An example of short questions:

[Home](#) [Course](#) [Discussion](#) [Wiki](#) [Progress](#) [Instructor](#)

[Course](#) > [MINERAL OPTICS](#) > [Common rock-forming minerals](#) > [Microcline](#)

[< Previous](#)



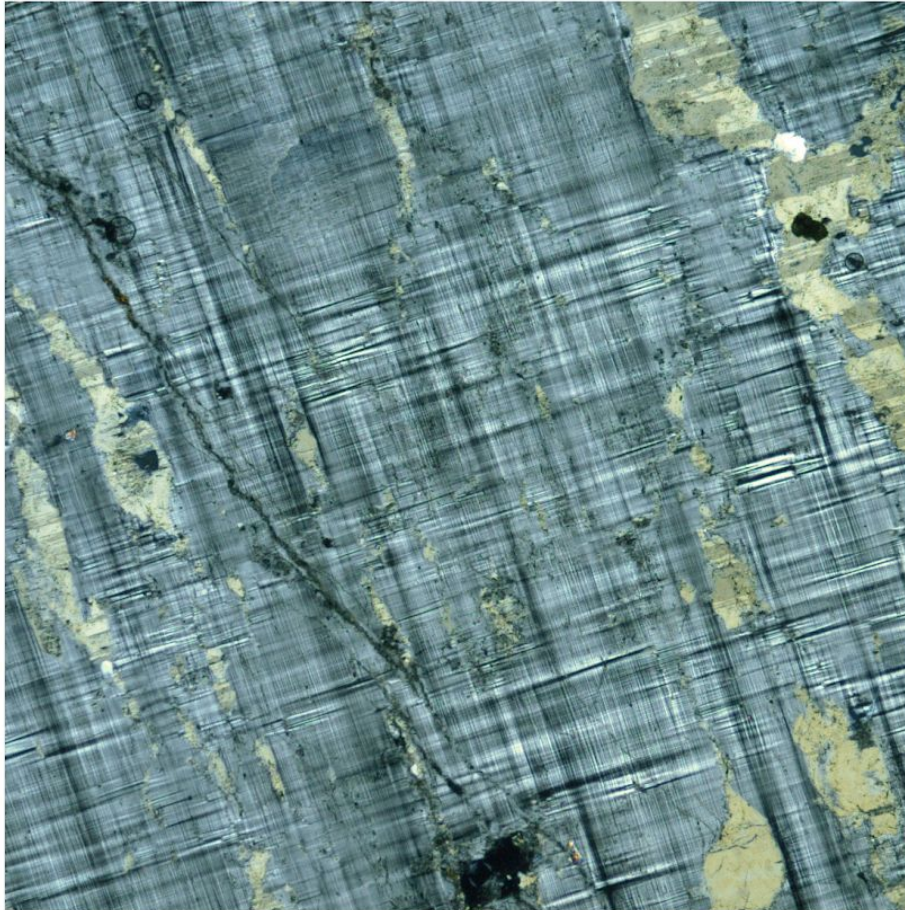
[Next >](#)

Microcline

[Bookmark this page](#)

[View Unit In Studio](#)

Observe the following micrograph and answer the questions.



Text Input

1 point possible (ungraded)

Name the twinning type shown in this micrograph, which is commonly found in microcline.

Submit

[Staff Debug Info](#)

[Show Answer](#)

[Submission History](#)

[Staff Debug Info](#)

[< Previous](#)

[Next >](#)

Module Summary

Products Produced : KEEP course

Total Estimated Duration Time**: N/A

Video Presentation Styles: N/A

Course(s) involved: ESSC4120

Note:

**Students enrolled in the course ESSC4120 can read the materials and answer the questions to self-learn.

(2) Volcanoes

It is a micro-module is developed on the KEEP platform and released as a private online course to supplement the curriculum course ESSC1000 and ESSC2010. A mini game and multiple choice questions are designed to test students' understanding of the topic.

Additionally, a free online app Kahoot and Flipped Classroom with questions about volcanoes were used as a learning game for students in ESSC2010, followed by a case study of Mt. Aso.

KEEP course Volcanoes:

KEEPCourse PHYS1277: Volcanoes Help PY Pui Yuk

View this course as: Staff

Home Course Discussion Wiki Progress Instructor

Volcanoes

Search the course Search Resume Course

VOLCANOES

Introduction

Viscosity of Magma Resume Course

Eruptive Styles

Frequency of Volcanic Activity

Volcanoes on Earth

Types of Volcanoes

Volcanic Rocks

Source of Magma - Tectonics

Case Study

Course Tools

Bookmarks

Important Course Dates

Today is Apr 30, 2018 13:11 HKT

Course End

in 1 month - May 31, 2018

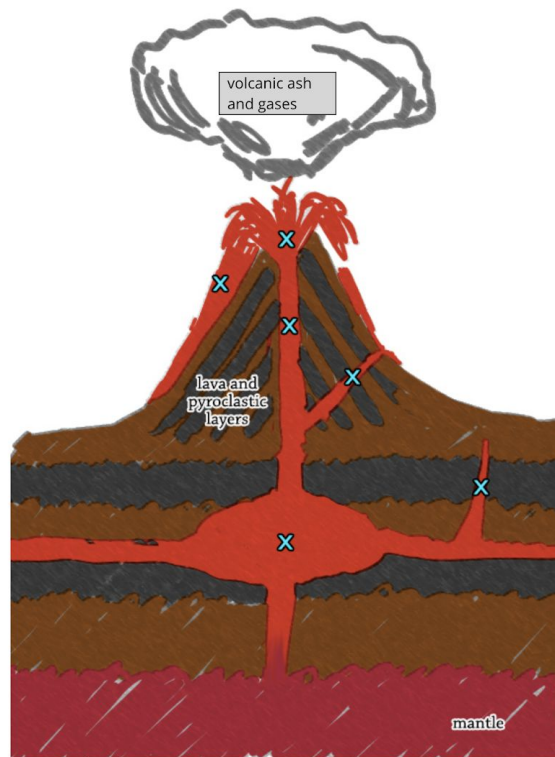
To earn a certificate, you must complete all requirements before this date.

Mini-game:

Components of a Volcano

1/1 point (ungraded)

Identify the components of a volcano. Drag the corresponding component to the correct 'X' points.



crater	dyke	lava	magma chamber	main vent	side vent
--------	------	------	---------------	-----------	-----------



Submit

Show Answer

Multiple-choice questions:

The 3 Factors

4 points possible (ungraded)

Let's have a quick review on how composition, gas content, and temperature affect the viscosity of magma.

When silica content increases, viscosity will

☐ increase.

☐ decrease.

When gas content increases, viscosity will

☐ increase.

☐ decrease.

Case study:

Course > VOLCANOES > Case Study > Mount Aso

< Previous



Next >

Mount Aso

[Bookmark this page](#)

[View Unit In Studio](#)

Mount Aso (阿蘇山, coordinates: 32°53'04"N 131°06'14"E) is one of the largest active volcanoes in the world. It is located in central Kyushu Island, Japan. It contains a large caldera with an area of 380 km². It has frequently been erupting ash recently and a strong volcanic eruption happened on 8 Oct 2016, which was the biggest eruption since 1980. This eruption caused pyroclastic flow reaching 2 km away from the volcano and ash covering a lot of facilities.



FILE PHOTO © Kyodo / Reuters

Press [Show Discussion](#) and [Expand Discussion](#) to reveal three discussion questions. It's mandatory to respond the one question you have been randomly assigned. You are also encouraged to discuss your teammate's responses and address the other two questions.

More information about the mount can be found here:

<https://www.usgs.gov/media/images/cinder-cone-mount-aso>

<https://www.volcanodiscovery.com/aso.html>

<http://www.ibtimes.ph/japan-mount-aso-volcano-erupted-after-36-years-4318>

<http://volcano.oregonstate.edu/aso>

A nice slide kindly prepared by Dr. Xiaowen Wang (University of Tokyo) can be found here: [Aso](#)

Also, I strongly encourage you to check more research papers using Google Scholar and/or Web of Science. You could start from checking this one: [A. Lin et al., Science \(2016\)](#)

[Staff Debug Info](#)

Capstone

Topic: / Mount Aso

[Hide Discussion](#)

[Add a Post](#)

Show all posts

by recent activity

Relationship with earthquakes

For the factors that triggers volcanic eruptionss, the occurance of earthquakes could be a factor triggering volcanic eruptions to happen. As during earthquakes, the rele...

1

2. Geophysical and geochemical observations.

The Aso Volcanological Laboratory, established in 1928 by Professor Toshi Shida, was the first permanent volcano observation facility in Japan. It has survived to this day...

14

3. Relationship with earthquakes.

Large earthquakes and active volcanoes are closely related natural phenomena resulting from plate tectonic processes. **How were earthquake activities related to the ...

15

1. Tectonic setting, composition, and structure.

There are about 108 active volcanoes located throughout Japan. Each of them is distant in its composition, type, eruption styles, and eruption intensities. **What are the...

17

Module Summary

Products Produced :	KEEP course
Total Estimated Duration Time**:	N/A
Video Presentation Styles:	N/A
Course(s) involved :	ESSC2010

Note:

**Students enrolled in the course ESSC2010 can read the materials and answer the questions to self-learn.

Additional outcomes with the KEEP course *Volcanoes*:

(1) Kahoot QnA mini game:

The screenshot shows a Kahoot! quiz interface. On the left, a sidebar displays the quiz title 'ESSC2010 Flipped Classroom Session', a 'Play' button, and statistics: 0 favorites, 5 plays, and 49 players. The main area shows a list of 9 questions with their respective images and 120-second timers. The questions are:

- Q1: Which volcano did Lin and his wife visit for their honeymoon? (hint: it was Christmas 2011)
- Q2: What is **magma**?
- Q3: This photo went viral in the past few days on the internet. What is this shown in the photo?
- Q4: Which of the rocks (granite, obsidian, gabbro) is **extrusive**? (hint: see photos)
- Q5: The **smoky cloud** that rises from the vent of this erupting volcano is composed of _____.
- Q6: Which of the following materials is the **most viscous**?
- Q7: When **silica content** of magma increases, its **viscosity** _____.
- Q8: Referring to the three diagrams, the **viscosity** of lava ____.
- Q9: T or F? Columnar jointing is a type of fracturing that **commonly** occurs in **basaltic** lava flows.

(2) Flipped Classroom:



Exit

Quiz

Save

Description

ESSC2010 Flipped Classroom Session



Quizzes

 Only me

Game Creator



1

Which volcano did Lin and his wife visit for their honeymoon? (hint: it was Christmas 2011)

Time limit

120s ▼



2

What is **magma**?

Time limit

120s ▼



3

This photo went viral in the past few days on the internet. What is this shown in the photo?

Time limit

120s ▼



(3) [Hong Kong Geology](#)

This course is an extra course designed for students to learn typical geological phenomenon in Hong Kong. A number of locations are introduced, including the Bluff Head, Po Toi Island, Tung Ping Chau, High Island and Lai Chi Chong. The format is to watch the geological field trip videos and answer questions. Students in ESSC1000, ESSC2010 and ESSC3100 are able to access the materials and get themselves prepared for corresponding field studies.

KEEPCourse ESSC1000: Hong Kong Geology Help PY Pui Yuk ▾

View this course as: Staff ▾

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Hong Kong Geology

Search the course Search Resume Course

Field Trips in Hong Kong

Po Toi Island Resume Course ↻

Bluff Head

Tung Ping Chau

High Island

Lai Chi Chong

Course Tools

Bookmarks

Important Course Dates

Today is Apr 30, 2018 13:55 HKT

Short questions:

KEEPCourse

ESSC1000: Hong Kong Geology

Help

PY Pui Yuk

View this course as: Staff

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Course > Field Trips in Hong Kong > Po Toi Island > Introduction


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Introduction

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View Unit in Studio



Start of transcript. Skip to the end.

Hello, today we are showing you granites in Hong Kong.

Do you know where we are?

Yes, you are right. It's Po Toi Island.

Po Toi Island is located at the south east of Hong Kong.

It comprises merely granites.

From megacrystic coarse-grained to equal granular fine-grained biotite granites.

They were formed about a hundred and forty million years ago, during the Early Cretaceous Period.

In this episode, we will look at the composition of

Multiple Choice

1 point possible (ungraded)

What kind of rocks is the Po Toi Island composed of?

☐ Sandstones

☐ Granites

☐ Gneisses

☐ Basalts

Submit

Show Answer

Submission History

Staff Debug Info

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Module Summary

Products Produced :

KEEP courses

Total Estimated Duration Time**:

N/A

Video Presentation Styles:

N/A

Course(s) involved :

ESSC1000, ESSC2010 and ESSC3100

Note:

**Students enrolled in the courses can read the materials and answer the questions to self-learn.

3. Evaluation Plan

Have you altered your evaluation plans?

What monitoring data did you collect?

Does your evaluation indicate that you have achieved your objectives?

The project is regarded as an effective mean for students to understand the Earth's systems. Below are the evaluation plans and the respective data:

(1) Surveys of students using the micro-modules and student helpers

- (a) As the student helpers are some of the students studying ESSC, we modify the evaluation plan and conduct a survey getting feedbacks from student users and student helpers. The survey has been sent to all ESSC students using the "geological field trips" but only 18 feedbacks are obtained (attachment "SurveyontheVirtualGeologicalFieldTrip.xls"). According to the survey, most of the students agree that the teaching videos are helpful with clear explanation. Some think that the duration for each episode is alright but some suggested longer ones. Some would like to help more for the production so that they could learn from the process.
- (b) The KEEP course "Volcano, Kahoot and Flipped Classroom, together with class discussion help students to understand volcanoes. "SurveyonFlipped-ClassroomTeachingandLearning.xls" shows the survey summary of the mentioned e-learning means. Most of the students are satisfied with the learning format. The whole learning set is informative, clear and interacts with students. Students are active in the classroom for the games and discussion.

(2) Number of views:

The teaching videos have records of over 1360 for geological field trips.

(3) Teachers' reflections:

Two teachers Prof LIU Lin and Dr. TAM Pui Yuk are using the micro-modules for 8 courses in ESSC. When comparing with the traditional classroom teaching and field study, both of them agree that the micro-modules shorten the time for pre-class / pre-trip tutorials. Students have greater motivation to read the materials as these materials help them to prepare for the class discussion and field assignments that were handed in right after the field study. When students have any questions after class or field study, they can access to the materials anytime to review and revise them to prepare for the examination. In traditional learning, students who are interested in practising

the skills in identifying rocks and minerals can borrow real rock and mineral samples in the laboratory. The “Rocks and Minerals Gallery” serves as the digital laboratory for the students, providing descriptions and real images of the same collections in the laboratory. Thus, the gallery is a study guide and reference for self-learning. The gallery and the teaching videos are not only limited to teaching, they can also be used in Open Day, Summer Workshop and high school talks to promote ESSC and science for the public.

4. Dissemination, diffusion and impact

Please provide examples of dissemination: website, presentations in workshops or conferences, or publications.

Please provide examples of diffusion: how the project results/process/outcomes/deliverables have been used in your unit and other parts of CUHK or other institutions?

Please provide examples of impact: how the project results (micro modules) can be adapted to other disciplines.

Dissemination:

To enhance e-learning practise, we join 2 major events to share and learn more about e-learning in different institutes:

- (1) A 10-minute talk to share our project outcomes during a sharing session with EdUHK and HKBU
- (2) Two abstracts submitted to EXPO 2017 to share our project outcomes and eLearning strategies:
 - A. “E-learning approach of Earth’s System Science” (posters expo 2017 elearning approaches.pdf)
 - B. “Using YouTube Analytics to enhance the video teaching effectiveness – a case study of ESSC educational videos” (posters expo 2017 - youtube analysis.pdf)

The outcomes can be used in the following areas:

- The e-learning products can continuously be used in our Programme, applying in the various of courses.
- These materials can be modified and released for high schools, the general public and in different occasions like CUHK Open Day, summer programmes and shared among universities.
- Possible cooperation with local educational units like Hong Kong Science Museum, and Hong Kong Observatory is suggested with the e-learning materials.

- There is also possible collaboration with other institutes abroad to share the learning materials. In return, Hong Kong students can access related materials in partner units. Science learning can be in a greater variety.

Future plan for the micro-modules:

- E-learning is a definitely a future learning trend and these materials serve as useful items in our future teaching in the programme.
- Students are invited to produce new teaching materials based on the current ones. They can make those materials more suitable and up-to-date under the supervision of teaching staff.
- Self-learn with the current materials may not be limited to CUHK students, but it also applies in high school students.
- Students may make use of the materials to further develop their teaching career (if they plan to work in educational field).
- As a basic ground, the materials could help students to think of other creative means to deliver science knowledge and promote science.

PART II

Financial data

Funds available:

Funds awarded from MMCDG	\$ 99,780
Funds secured from other sources	\$ 0
(please specify)	
Total:	\$ 99,780

Expenditure:

Item	Budget as per application	Expenditure	Balance
Teaching assistant	71,366.3	71,366.3	28413.70
Student helpers ¹	4400	17007.38	11406.32
Equipment ² - iMac	9,988	11,498	-91.68
Field study and transportation ³	11,025.7	0	-91.68

PowToon Educational Plan - Classroom ELITE annual subscription ⁴	3000	0	-91.68
Total:	99780	99871.68	-91.68

Note:

¹ More student helpers are needed for field investigation, shooting and editing the materials, thus more budget has been allocated for the student helpers.

² A more advanced iMac was purchased to have better functions for the editing tasks.

³ As mentioned in our plan, preliminary study was needed for safety and selection of micro-module materials. After pre-trip examination, we decided to revisit some previous destinations and got more rich geological contents. Thus, very little amount of public transport fee was needed and we decided not to include in the expense.

⁴ As we have a free website WIX for our micro-modules in which materials are categorized into educational videos, KEEP courses and Flipped Classroom. The budget for Classroom ELITE annual subscription can be free for other uses.

PART III

Lessons learnt from the project

Please describe your way forward.

Please describe any of the following item(s) accordingly:

- *Key success factors, if any*
- *Difficulties encountered and remedial actions taken, if any*
- *The role of other units in providing support, if any*
- *Suggestions to CUHK, if any*
 - *Example: what should be done differently?*

Generating the micro-modules is a new attempt in the teaching field and this is a great chance for me to review the means in sharing knowledge with students. Setting the teaching materials for classroom teaching and field study is not hard, but ensuring students learning effectively and efficiently is not easy. Students nowadays are busy in different commitments, some may need more time to digest all materials in addition to classroom teaching and field study, while some prefer to have their own study schedules and styles. Uploading all these interactive micro-modules to a platform could enhance students' learning outside fixed schedules. For instance, students could exercise their rocks and minerals identification skills which need more practise, according to their schedules. There is no limitation for them to access the

materials. Together with the “Rocks and Minerals Gallery” as the teaching guide, students can gain more hands-on experience of the skills when they visit the laboratory.

Our senior students are getting prepared to enter the society. Some of them have their thoughts about an effective way of learning and are willing to share their ideas. As a teacher, I have to be open-minded and trust students’ ability in suggesting a better teaching way. Student helpers, as well as the teaching assistant, are definitely a strong manpower to the production. They are not just mechanically helping field shooting, taking photos, editing videos and creating KEEP courses and Flipped Classroom, they provide very useful suggestions to revise the materials again and again. Besides, student helpers performed better in their classes as they spent more time in learning while revising materials for the micro-modules.

There are four major obstacles we encounter during the production:

- (1) It was planned to use a software, PowToon, proposed in our project application to make animations to help students study rocks and minerals. After a trial, we discussed not to use it at the moment. The reason is that the completed animation file couldn’t integrate the sample image of the best resolution. Therefore, we decided to replace the animation with the best quality sample photo directly with detailed annotation to emphasize the fundamental knowledge. The budget previously for the software purchase has been reallocated to the recruitment of more student helpers to work on the samples annotation.
- (2) It was planned that animations to simulate the geological process will be used in each video and the work was allocated to our contract company (Hong Kong Discovery). Due to lack of geological background and slow pace of editing of this company, the final products provided are less geologically accurate. Therefore, we decided to:
 - a. slightly reduce the amount of animations in the video so as to buy more time from our student helpers to make the animations correct;
 - b. replace some animations with other means, such as experiments and sketches, so as to guarantee the video’s quality;
 - c. recruit more student helpers to work on the project, especially for the

field shooting and video editing.

- (3) The geological materials of Taiwan shooting are much richer than we expected. We believed that these materials are not only different from those in Hong Kong, but they are also more valuable to be used in the micro-modules. The time needed for editing these materials would be much longer than we planned. Thus, we decided to reduce the number of local field shooting but spend more time on the edition of this part. An increase number of student helpers are expected.
- (4) One shooting of local geological features of an area may not be done in one day. It is because changing/bad weather and sea conditions could greatly affect the safety and the video quality. Thus, pre-trip study is needed to ensure the safety and back-up plan for the field shooting. Due to safety concern and more time for Taiwan materials editing, originally planned five local field shooting will be reduced to two local field shooting.

There is no doubt that the project enrich my teaching experience and has driven me to be more passionate in various means of teaching. Since the project also provides an opportunity for students to self-learn, I would suggest a 2-year funding with more budget. I believe this will produce higher quality micromodules, as well as promoting science. Students and general public could benefit from the resources.

PART IV

Information for public access

Summary information and brief write-ups of individual projects will be uploaded to a publicly accessible CUHK MMCDG website. Please extract from Part I the relevant information to facilitate the compilation of the publicly accessible website and reports.

1. Keywords

Please provide five keywords (in the order of most relevant to your project to least relevant) to describe your micro-modules/pedagogies adopted.

- (Most relevant)
- Keyword 1: Virtual Field Trip
 - Keyword 2: Rocks and Minerals Gallery
 - Keyword 3: Geological
 - Keyword 4: Volcanoes

2. Summary

Please provide information, if any, in the following tables, and provide the details in Part I.

Table 1: Publicly accessible online resources (if any)

(a) Project website:

If a publicly accessible project website has been constructed, please provide the URL.

A platform with all ESSC e-learning materials:

<https://cuhkesscelearn.wixsite.com/home>

Note:

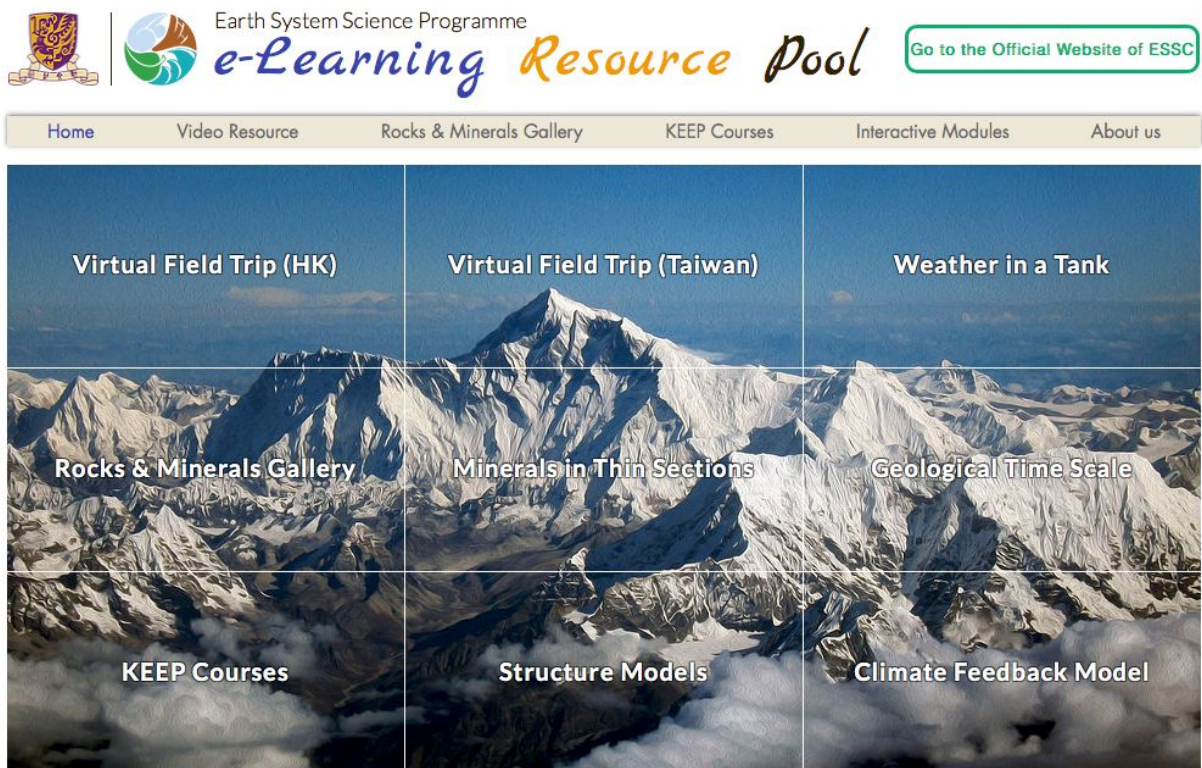
Rocks and Minerals Gallery, Virtual Geological Field Trip and KEEP courses
Petrology and Geology are partly supported by this fund.

Rocks and Minerals Gallery:

<https://cuhkesscelearn.wixsite.com/home/rocks-minerals>

Virtual Geological Field Trip (educational videos):

<https://cuhkesscelearn.wixsite.com/home/video-resource>



(b) Webpage(s):

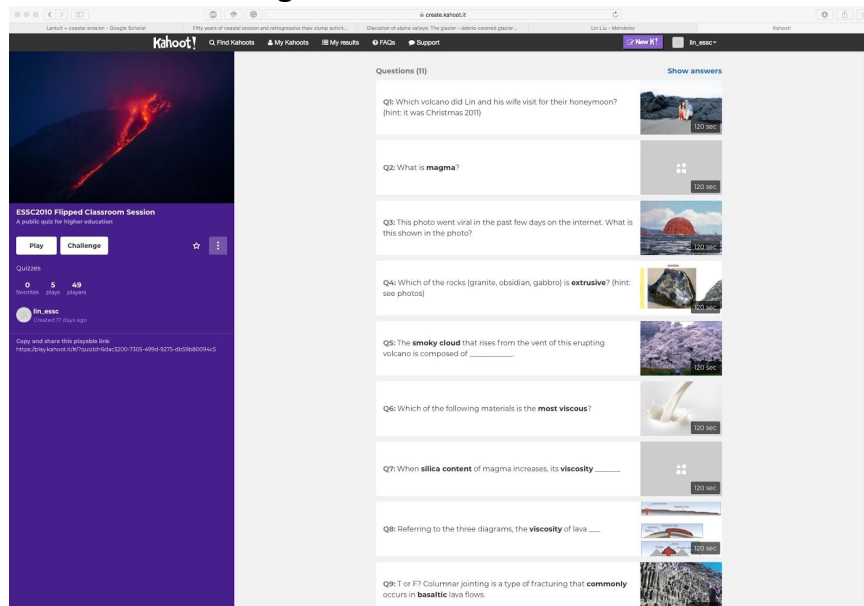
If information of your project is summarized in a webpage (say a page in the department's or faculty's website), please provide the URL(s) here.

We have already setup a elearning resource website, therefore we don't have a web-page in the department's website. However, people visiting this web-page can go to ESSC official website by clicking the button at the right hand corner of the Home Page.

(c) Tools / Services:

If you have used any tools or services for the project, please provide names of the tools or services in here.

Kahoot QnA mini game carried out in class session:



(d) Pedagogical Uses:

If any flipped classroom activities have been conducted, please provide information in here. If relevant, please indicate how your project output can be used to support flipped classroom activities.

Flipped Classroom:

Description

ESSC2010 Flipped Classroom Session

 Only me

Game Creator

1

Which volcano did Lin and his wife visit for their honeymoon?
(hint: it was Christmas 2011)

Time limit
120s ▾

2

What is **magma**?

Time limit
120s ▾

3

This photo went viral in the past few days on the internet. What is this shown in the photo?

Time limit
120s ▾

(c) Others (please specify):

KEEP courses (<https://cuhkesscelearn.wixsite.com/home/keep-courses>)

- (1) Petrology
- (2) Volcanoes
- (3) HK Geology



Volcanoes [\(click here to start\)](#)



'Volcanoes' is one of the significant features on Earth. This module introduces volcanoes, with detailed explanations in their composition, formation, eruptive style, type, etc. We will also study some tectonic settings and magma. There will be interactive games and videos.

Course(s): ESSC2010

Petrology [\(click here to start\)](#)



This course will introduce you to the study of igneous, sedimentary and metamorphic rocks of the earth's crust and mantle. We will investigate the origin of the major groups of igneous, sedimentary and metamorphic rocks with an emphasis on the physical and chemical processes that give rise to these different rock types. In addition, corresponding tectonic settings and paleo-environments for these rocks will be studied. You will learn how to classify rocks based on rock-forming minerals in hand specimen and thin sections, as well as their textures and structures.

Course(s): ESSC4120

HK Geology [\(click here to start\)](#)



In this course, students can learn typical geological phenomenon in Hong Kong. A number of locations will be introduced, including the Bluff Head, Po Toi Island, Tung Ping Chau, High Island and Lai Chi Chong. The format is to watch the geological field trip videos and answer questions.

Course(s): ESSC1000, ESSC2010, ESSC3100

Table 2: Resources accessible to a target group of students (if any)

If resources (e.g. software) have been developed for a target group of students (e.g. in a course, in a department) to gain access through specific platforms (e.g. Blackboard, facebook), please specify.

<u>Course Code/ Target Students</u>	<u>Term & Year of offering</u>	<u>Approximate No. of students</u>	<u>Platform</u>
<i>Eg1. DEPTXXXX</i>	<i>1st term 2015</i>	<i>50</i>	<i>Blackboard</i>
<i>Eg2: Dept of xxxx</i>	<i>All 1st year students</i>	<i>40</i>	<i>facebook</i>

Table 3: Presentation (if any)

Please classify each of the (oral/poster) presentations into one and only one of the following categories

	Number
(a) In workshop/retreat within your unit (e.g. department, faculty)	<i>Please insert no</i>
(b) In workshop/retreat organized for CUHK teachers (e.g. CLEAR	<i>Please insert no</i>

workshop, workshop organized by other CUHK units)	
(c) In CUHK ExPo jointly organized by CLEAR and ITSC	<i>2 poster presentations</i> <i>1 oral presentation</i>
(d) In any other event held in HK (e.g. UGC symposium, talks delivered to units of other institutions)	One 10-min sharing session with EdUHK and HKBU
(e) In international conference	<i>Please insert no</i>
(f) Others (please specify)	<i>Please insert no</i>

Table 4: Publication (if any)	
<i>Please classify each piece of publication into one and only one of the following categories</i>	Number
(a) Project CD/DVD	<i>Please insert no</i>
(b) Project leaflet	<i>Please insert no</i>
(c) Project booklet	<i>Please insert no</i>
(d) A section/chapter in a booklet/ book distributed to a limited group of audience	<i>Please insert no</i>
(e) Conference proceeding	<i>Please insert no</i>
(f) A chapter in a book accessible internationally	<i>Please insert no</i>
(g) A paper in a referred journal	<i>Please insert no</i>
(h) Others (please specify)	<i>Please insert no</i>

3. A one-page brief write up

Please provide a one-page brief write-up of no more than 500 words and a short video.

Nowadays, development of pedagogy changes fast with advanced technology. Online interactive micro-modules are believed to be the future trend of learning. At the same time, this could enhance students' self-study in addition to traditional classroom teaching. With the support of Micro-Module Courseware Development Grant, we have finished FOUR intensive micro-modules, including "Rocks and Minerals Gallery", "Virtual Geological Field Trip (Hong Kong)", "Virtual Geological Field Trip (Taiwan)" and three KEEP courses.

- (1) **“Rocks and Minerals Galley”** serves as a database that contains high quality photos of the rock and mineral samples in our unit’s laboratory Science Center 331, with annotation. Students, as well as the general public, can access to the materials by visiting the website: <https://cuhkesscelearn.wixsite.com/home/rocks-minerals>. Together with the “Rocks and Minerals Gallery” as the teaching guide, students can gain more hands-on experience of the skills when they visit the laboratory.
- (2) **Virtual Geological Field Trip (Hong Kong)** displays 32 educational videos of 5 geologically interesting destinations in Hong Kong.
- (3) **Virtual Geological Field Trip (Taiwan)** displays 18 educational videos of Taiwan’s geologically interesting destinations from the north to the south of the island.
- (4) Three KEEP courses, namely **“Petrology”**, **“Volcanoes”** and **“HK Geology”**, are designed to enhance self-study. The contents of the KEEP courses align with the educational videos, Rocks and Minerals Gallery and ESSC programme courses. Students enrolling particular ESSC programme courses can log into the respective KEEP courses to test their understanding of related topics.

Beside, Kahoot QnA mini game and a Flipped Classroom are designed to facilitate learning and discussion both in and outside classroom.