Tai Po Kau and vicinity VR Field Trip
Student worksheet and data recording sheet
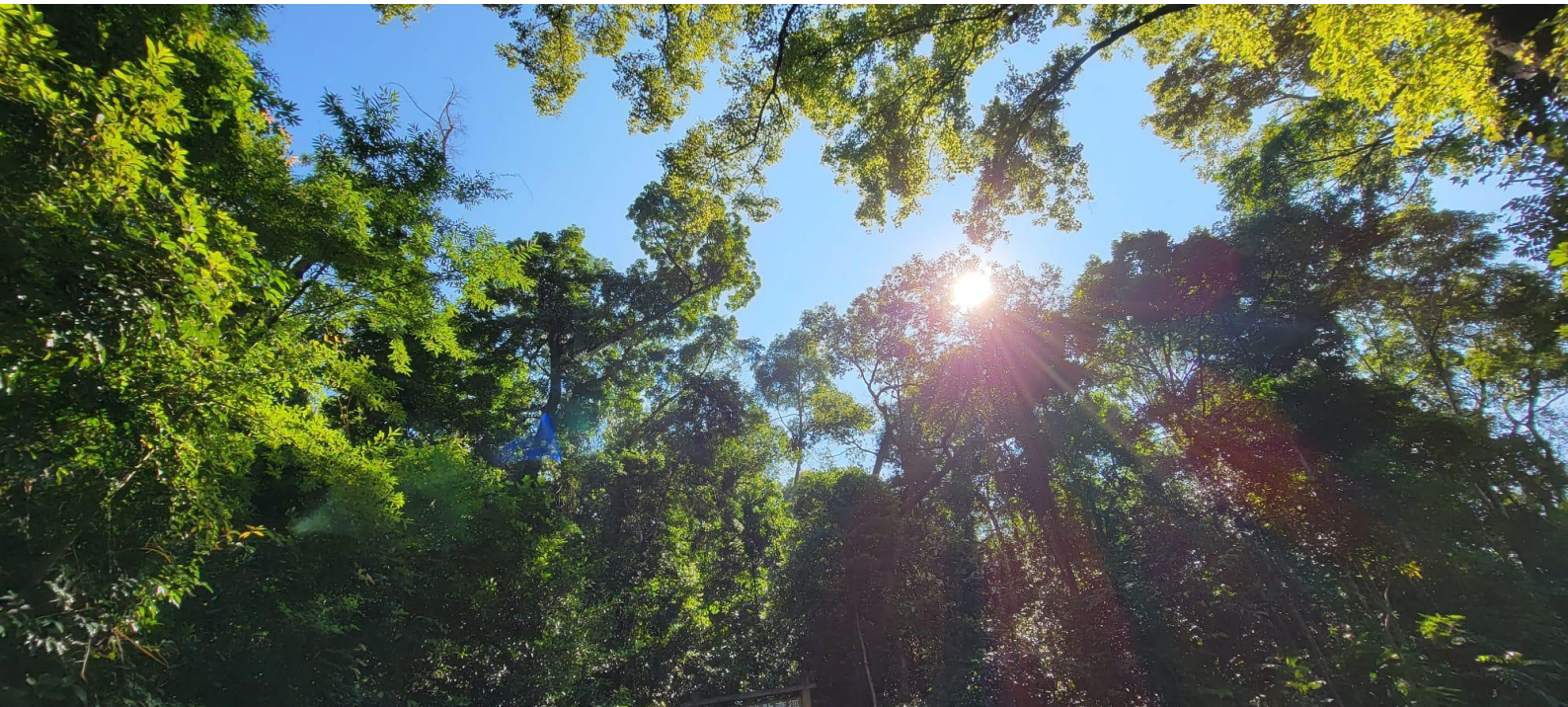
Tai Po Kau and vicinity VR Field Trip (Plants)

Inquiry question
The relationship between the slope aspect and the number of plants and characteristics

Hypothesis
There are fewer plants and types in north-facing slopes than those in south-facing slopes in Luk Shan in Tai Po Kau.
There are more plants and more complex structures in Tai Po Kau Nature Reserve than outside of the Tai Po Kau Nature Reserve.

Introduction of virtual field sites
Tai Po Kau and vicinity VR Field Trip (Plants) teaching kit includes 3 field sites:
Field site 1a： Plants in a north-facing slope (North-West) in Luk Shan (Tai Po Kau Nature Reserve – Road side)
Field site 1b：Plants in anorth-facing slope (North-West) in Luk Shan (Tai Po Kau Nature Reserve – Inside a woodland)
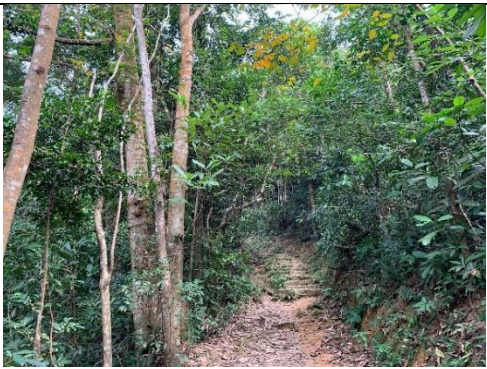Field site 2：Plants in a south-facing slope (South-East) in Luk Shan (adjacent to Tai Po Kau Nature Reserve)

[Note：In the EduVenture VR teaching materials, a tall tree in each of the field sites was selected for measurement and data display in order to compare the characteristics of the plants in different field sites.]

Distribution map of the 3 field sites in Tai Po Kau and vicinity VR Field Trip (Plants)： www.map.gov.hk/gm/s/d/ow47vbBK

Information and background of the 3 field sites of virtual field study in Tai Po Kau and vicinity

Field site 1a：Plants in a north-facing slope (North-West) in Luk Shan (Tai Po Kau Nature Reserve – Road side) Field site 1a is near Tai Po Kau Village, at the side of a pedestrian/vehicle road in the Tai Po Kau Nature Reserve and at the entrance of the Tai Po Kau Nature Trail. The slope aspect is north-facing (North-West) in Luk Shan.	
Field site 1b：Plants in a north-facing slope (North-West) in Luk Shan (Tai Po Kau Nature Reserve – Inside a woodland) Field site 1b is inside the Tai Po Kau Nature Trail, far from the vehicle road. The slope aspect is north-facing (North-West) in Luk Shan. The nature reserve is luxuriant with various species.	
Field site 2：Plants in a south-facing slope (South-East) in Luk Shan (adjacent to Tai Po Kau Nature Reserve) Field site 2 is near Tai Po Kau Nature Reserve and located at the south-facing slope (South-East) in Luk Shan. The slope has been protected by stabilization works, with steel wire	

meshes (in green plastic coats) to prevent soil erosion.	

The apps and instruments being used for the VR field trip.

Field study instruments :	Apps/Electronic instruments :
Rope	360 camera
7.5-meter measuring tape	Camera drone
Electronic scale	Data recorder
Paper cup	Light and Color Sensor
	Weather Sensor
	Air Sensor
	Soil Moisture Sensor
	Soil Temperature Sensor
	Calcium Ion-Selective Electrode Sensor
	Nitrate Ion-Selective Electrode Sensor
	Conductivity Probe
	pH Sensor
	Mobile phone & Tablet Applications: Measure (iOS) Arboreal - Tree height

How to download the Tai Po Kau and vicinity VR Field Trip (Plants) teaching kit

1. Download EduVenture VR App

 EduVenture VR

iOS	Android
https://apps.apple.com/hk/app/eduventure-vr/id1481552336	https://play.google.com/store/apps/details?id=cuhk.clst.evvr&hl=zh_HK&gl=US

2. Using a tablet or mobile phone, download Tai Po Kau and vicinity VR Field Trip (Plants) teaching kit from EduVenture VR.

EduVenture VR teaching kit：

Link: eduventure.vr://?6c6f63610f093a30=657676725a554646

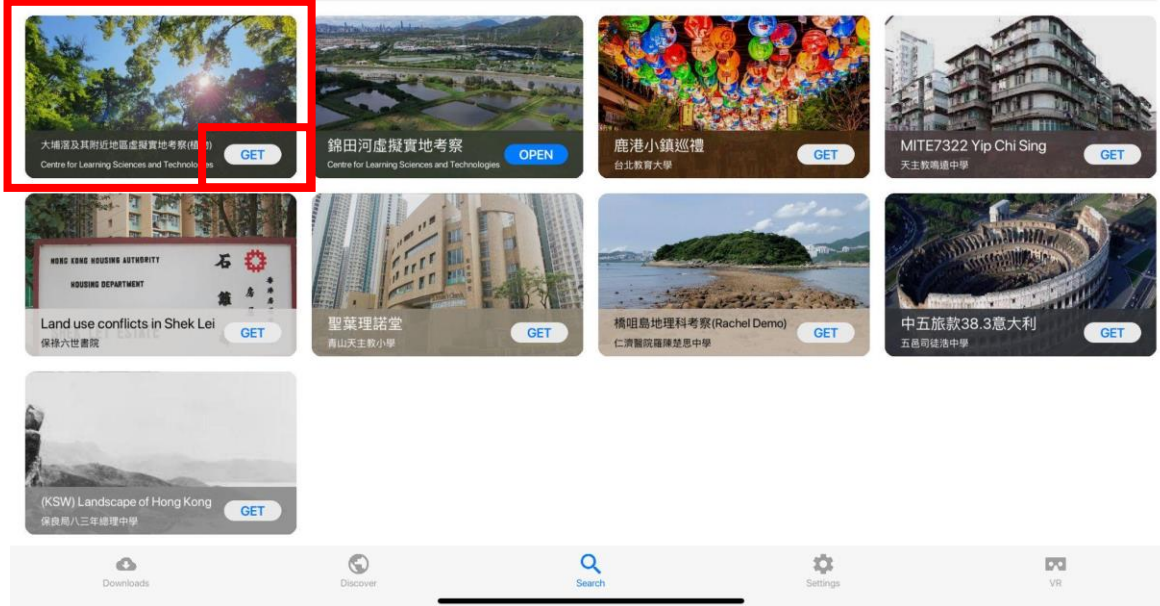(Note: This link is only applicable to tablets/mobile phones)
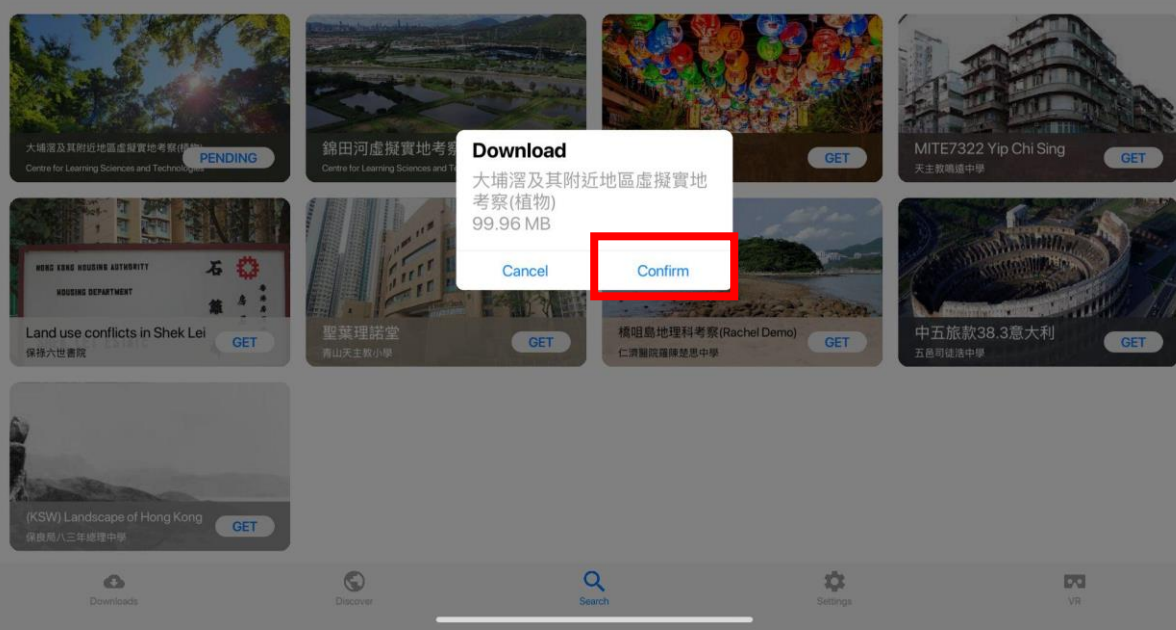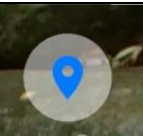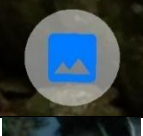
The steps to use the VR Field Trip teaching kit and collect data

Step 1：Read the data recording sheet on the student worksheet

Step 2：Open EduVenture VR teaching kit, move your tablet or mobile phone to watch the 360 photo, and use the cursor ◯ to choose the interactive elements

Sign	Interactive elements
	Teleport
	Image tag
	Information

Step3：Observe the information in the VR Field Trip teaching kit, and fill in the data recording sheet. The three VR field sites and related observation and data collection activities are as follows:

VR field site	Observe and listen to the additional information	Observe and collect data, fill in the data recording sheet
（Aerial photos）Field site 1a： Plants in a north-facing slope (North-West) in Luk Shan (Inside the Tai Po Kau Nature Reserve)	• Observe the aerial photo of the plants in a north-facing slope (North-West) in Luk Shan (Inside the Tai Po Kau Nature Reserve)	-

VR field site	Observe and listen to the additional information	Observe and collect data, fill in the data recording sheet
Field site 1a : Plants in a north-facing slope (North-West) in Luk Shan (Tai Po Kau Nature Reserve – Road side)	-	(1) Crown width and shape (2) Circumference (3) Climbers (4) Other plants characteristics
Field site 1b : Plants in a north-facing slope (North-West) in Luk Shan (Tai Po Kau Nature Reserve – Inside woodland)	-	(5) Number of vegetation species/ vegetation coverage (6) Light intensity (7) Temperature (8) Moisture (9) Particulate matter (PM2.5) (10) CO_2 (11) Wind speed (12) Air pressure (13) Altitude (14) Soil moisture (15) Soil temperature (16) Soil Nitrates (17) Soil Calcium (18) Soil electrical conductivity (19) Soil pH value (20) Any human activity?
Field site 2 : Plants in a south-facing slope (South-East) in Luk Shan (adjacent to Tai Po Kau Nature Reserve)	-	(1) Crown width and shape (2) Circumference (3) Climbers (4) Other plant characteristics

VR field site	Observe and listen to the additional information	Observe and collect data, fill in the data recording sheet
		(5) Number of vegetation species/ vegetation cover (6) Light intensity (7) Temperature (8) Moisture (9) Particulate matter (PM2.5) (10) CO_2 (11) Wind speed (12) Air pressure (13) Altitude (14) Any human activity?

Data recording sheet

The date of the field study：25/10/2021

Time：13:30-17:00

Weather of the day (data from the Hong Kong Observatory website)： Weather information on 25/10/2021

Maximum temperature：27.5°C

Minimum temperature：19.7 °C

Relative humidity：56 - 74 %

Rainfall distribution：0 mm

The rainfall distribution 3 days before the field study (data from the Hong Kong Observatory website)：

	22/10/2021 Weather Information	**23/10/2021 Weather Information**	**24/10/2021 Weather Information**
Maximum temperature：	20.5 °C	22.7°C	26.6 °C
Minimum temperature：	18.2 °C	18.3 °C	19.8 °C
Relative humidity：	69 - 87 %	70 - 82 %	57 - 79 %
Rainfall distribution：	traces of rainfall	0 mm	0 mm

Recording sheet

	Field site 1a： Plants in a north-facing slope (North-West) in Luk Shan (Tai Po Kau Nature Reserve – Road side)	Field site 1b： Plants in a north-facing slope (North-West) in Luk Shan (Tai Po Kau Nature Reserve – Inside woodland)	Field site 2： Plants in a south-facing slope (South-East) in Luk Shan (adjacent to Tai Po Kau Nature Reserve)
Observation：Crown width and shape			
Measurement：Circumference (cm)			
Measurement：Tree Height (m)			
Observation：Any species attached to trunks (Climbers / Lichens / Fungus)	Climbers：Yes／No Lichens：Yes／No Fungus：Yes／No	Climbers：Yes／No Lichens：Yes／No Fungus：Yes／No	Climbers：Yes／No Lichens：Yes／No Fungus：Yes／No
Observation：Other plant characteristics (e.g. buttress roots, plant shape)	Buttress roots：Yes／No Plant shape：_____ Other plant characteristics：_____	Buttress roots：Yes／No Plant shape：_____ Other plant characteristics：_____	Buttress roots：Yes／No Plant shape：_____ Other plant characteristics：_____
Observation and counting：Number of vegetation species / vegetation cover			

	Field site 1a： Plants in a north-facing slope (North-West) in Luk Shan (Tai Po Kau Nature Reserve – Road side)	Field site 1b： Plants in a north-facing slope (North-West) in Luk Shan (Tai Po Kau Nature Reserve – Inside woodland)	Field site 2： Plants in a south-facing slope (South-East) in Luk Shan (adjacent to Tai Po Kau Nature Reserve)
Observation and counting： Layered/ Stratified structure (Aerial video)	https://youtu.be/8XN4wUac5EE Watch the aerial video: ➢ Count the number of layered structures that you can identify _____ ➢ Draw a woodland profile on page 14		https://youtu.be/F6JlinEySGo Watch the aerial video: ➢ Count the number of layered structures that you can identify _____ ➢ Draw a woodland profile on page 14
Measurement： Light intensity (lux)			
Measurement： Temperature (°C)			
Measurement： Moisture (%)			
Measurement： Particulate matter $PM_{2.5}$ (µg/m³)			
Measurement： CO_2 (ppm)			
Measurement： Wind speed (m/s)			
Measurement： Air pressure (mbar)			

	Field site 1a： Plants in a north-facing slope (North-West) in Luk Shan (Tai Po Kau Nature Reserve – Road side)	Field site 1b： Plants in a north-facing slope (North-West) in Luk Shan (Tai Po Kau Nature Reserve – Inside woodland)	Field site 2： Plants in a south-facing slope (South-East) in Luk Shan (adjacent to Tai Po Kau Nature Reserve)
Measurement：Altitude (m)			
Measurement：Soil moisture (%)			N/A
Measurement：Soil temperature (°C)			
Measurement：Soil Nitrates (mg/L)			
Measurement：Soil Calcium (mg/L)			
Measurement：Soil electrical conductivity (µS/cm)			
Measurement：Soil pH value			
Observation：Any human activity? E.g. Urbanization / Road construction / Recreational activities	Yes／No If yes, please specify:	Yes／No If yes, please specify:	Yes／No If yes, please specify:

Field site	Observe and draw a woodland profile
Field site 1a / 1b : Plants in a north-facing slope (North-West) in Luk Shan (Inside Tai Po Kau Nature Reserve)	
Field site 2 : Plants in a south-facing slope (South-East) in Luk Shan (adjacent to Tai Po Kau Nature Reserve)	

Conclusion

Does the fieldwork result support the conclusion below? Explain your conclusion with the collected data.

Hypothesis 1：There are fewer plants and types in north-facing slopes than those in south-facing slopes in Luk Shan in Tai Po Kau.

Is the hypothesis valid? Yes / No

_____

_____

_____

Does the fieldwork result support the conclusion below? Explain your conclusion with the collected data.

Hypothesis 2：There are more plants and more complex structures in the Tai Po Kau Nature Reserve than outside of the Tai Po Kau Nature Reserve.

Is the hypothesis valid? Yes / No

_____

_____

_____

Evaluation

Other than the data collected in this course, suggest another inquiry question, and list the data and information you might need for the field work. Explain your answers.

_____

_____

_____

_____