Kam Tin River virtual field trip

Student worksheet and data recording sheet

香港中文大學 學習科學與科技中心

Curriculum Development Institute, Education Bureau
e-Learning in Geography Series (20):
Workshops on using information technology to develop geography virtual fieldwork materials on rivers (New)

Kam Tin River virtual field trip

Inquiry question

Investigate the old and new Kam Tin River management strategies and flood discharge capacity

Hypothesis

The more the river management strategies, the higher the flood discharge capacity.

Introduction of virtual field sites

Kam Tin River virtual field trip teaching kit includes 6 field sites:

Field site 1: Natural river in Lui Kung Tin and Kap Lung (Upper course of Kam Tin River)

Field site 2: Lui Kung Tin Catchwater (Upper course of Kam Tin River)

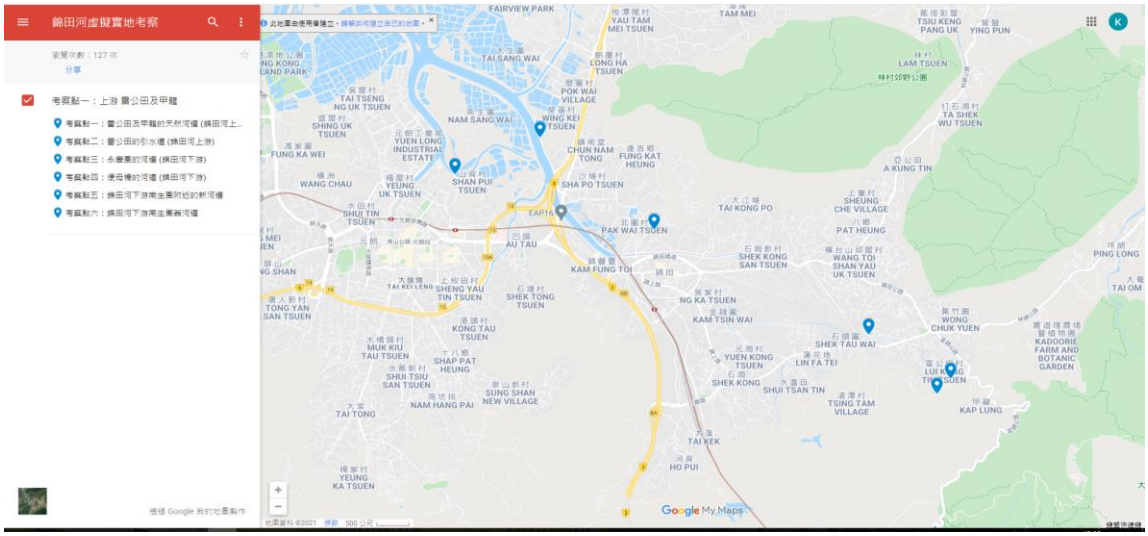
Field site 3: River in Wing Hing Wai (Lower course of Kam Tin River)

Field site 4: River under Bin Mo Bridge (Lower course of Kam Tin River)

Field site 5: New river in the lower course of Kam Tin River near Nam Sang Wai

Field site 6: Old river in the lower course of Kam Tin River near Nam Sang Wai

Distribution map of the 6 field sites in Kam Tin River virtual field trip：
https://www.google.com/maps/d/u/0/edit?mid=1AN4fsf26EbKHc2HdAi2juoccTAfnZj9s&usp=sharing



The information and background about the 6 field sites of virtual field study in Kam Tin River

Field site 1: Natural river in Lui Kung Tin and Kap Lung (Upper course of Kam Tin River) Kam Tin River originates from the highest peak of Hong Kong, Tai Mo Shan. The majority of its tributaries in the upper course are steep and narrow. Rainwater that falls on Kam Tin Plain and its mountain ranges nearby will form streams, which eventually join Kam Tin River and feed into Deep Bay.	
Field site 2: Lui Kung Tin Catchwater (Upper course of Kam Tin River) The government built a catchwater in Lui Kung Tin, aiming to carry water from Kam Tin River upstream to Tai Lam Chung Reservoir.	
Field site 3: River in Wing Hing Wai (Lower course of Kam Tin River) The government carried out channelization in Wing Hing Wai to lower the risk of flooding.	

Field site 4: River under Bin Mo Bridge (Lower course of Kam Tin River)

Built in 1710 by Tang Chun Yuen, Bin Mo Bridge allowed his mother to easily cross the river. The bridge is listed as a Grade II historic building by the Antiquities and Monuments Office. Despite the significant changes in the Kam Tin River channel after the drainage improvement works was finished in the 2000s, the natural meander in the surrounding area has been preserved well.

Field site 5: New river in the lower course of Kam Tin River near Nam Sang Wai

Meander is a typical fluvial landform of the lower course of Kam Tin River near Nam Sang Wai. From time to time, flooding occurs there. Therefore, at the downstream area of Nam Sang Wai, a new river channel of 120 meters wide and 3 kilometers long was built by excavating some fishponds in the surround area. This river goes through Name Sang Wai and runs straightly to Shan Pui River. Constructed with concrete

riverbanks, the new channel is located next to wetlands, providing habitats similar to the original wetland environment.	
Field site 6: Old river in the lower course of Kam Tin River near Nam Sang Wai The old river in the lower course of Kam Tin River near Nam Sang Wai is a typical meander, narrow and winding, with many vegetations on the riverbanks. In the past, before Kam Tin River was diverted, that river section would store all the rainwater from torrential rainstorms, resulting in high river discharge and frequent flooding in the low-lying areas of Kam Tin.	

The applications and instruments shown in the list below were used for designing the VR field trip materials and collecting data.

Field study instruments：	**Applications/Electronic instruments：**
30-meter measuring tape	360 camera
Ruler	Camera drone
7.5-meter measuring tape	Data recorder
6 plastic bottles	Current meter
Rope	D.O. meter
	Mobile phone or Tablet AR App (iOS): Measure (iOS)

How to download the Kam Tin River virtual field trip teaching kit

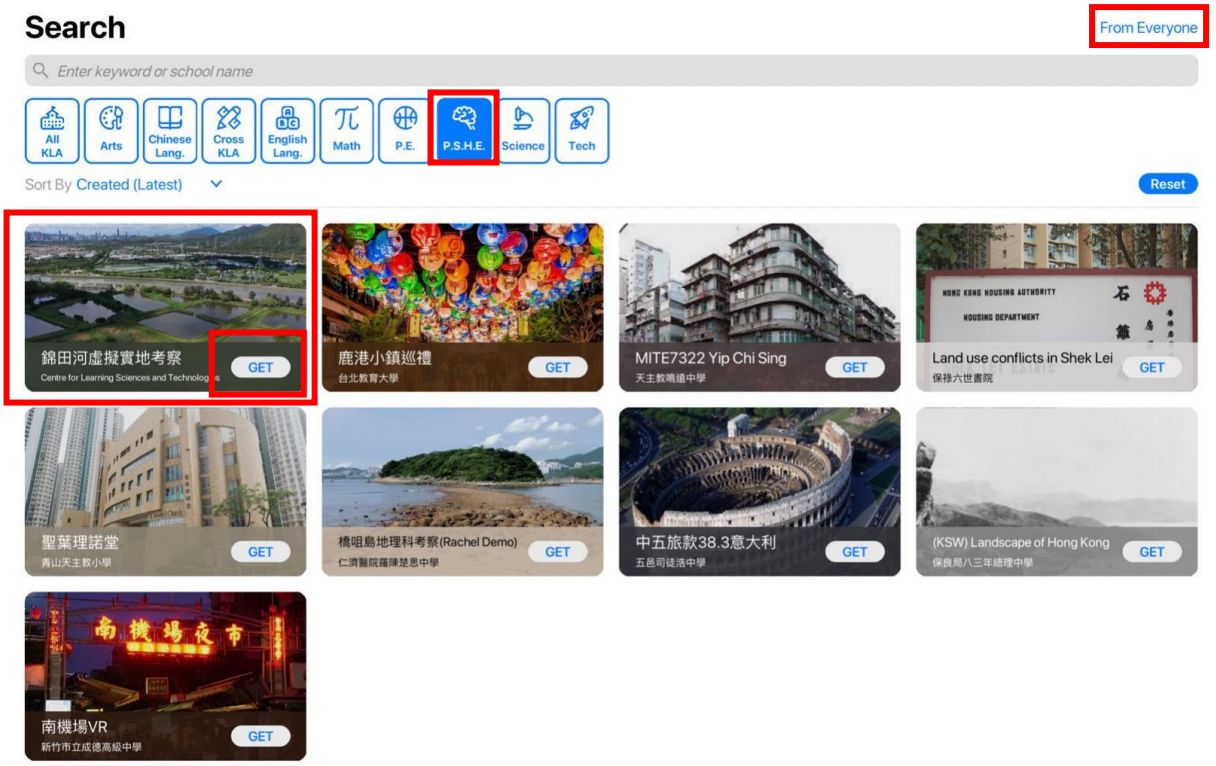
1. Download EduVenture VR App

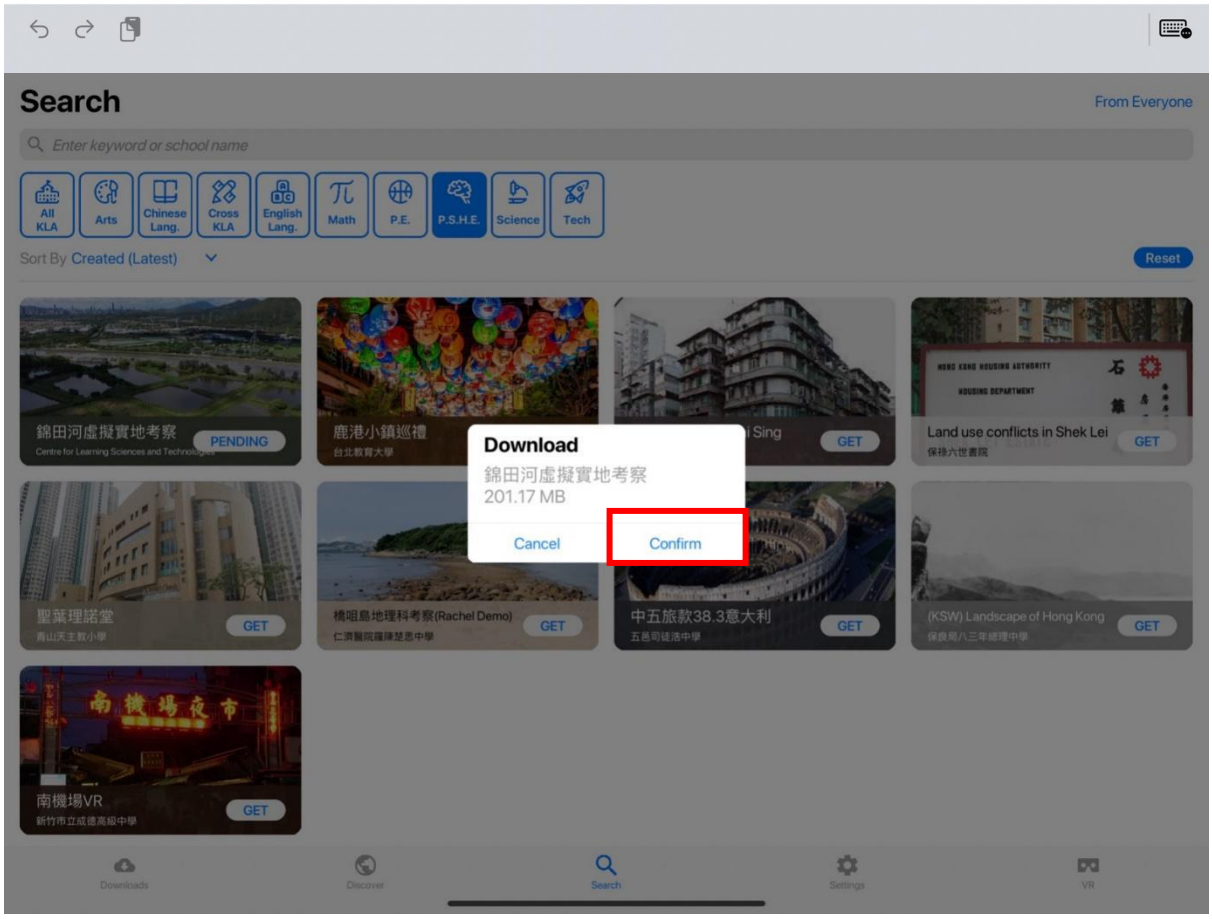
EduVenture VR

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 Kam Tin River virtual field trip teaching kit from EduVenture VR.

EduVenture VR teaching kit： Kam Tin River virtual field trip
Link: eduventure.vr://?6c6f63610f093a30=657676725a59444c
(Note: This link is only applicable to tablets/mobile phones)

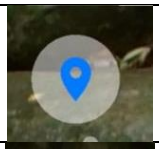
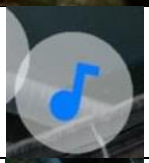
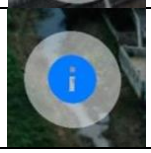




The step to observe VR Field Trip teaching kit and data collection

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
	Voice tag
	Information

Step3：Observe the information of the VR Field Trip teaching kit, fill-in the data recording sheet. The six VR field site 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 1: Natural river in Lui Kung Tin and Kap Lung (Upper course of Kam Tin River)	• Observe the photo of the upper course, Lui Kung Tin, Kap Lung • Observe the photo of the upper course, Lui Kung Tin Catchwater	-
Field site 1: Natural river in Lui Kung Tin and Kap Lung (Upper course of Kam Tin River)	-	(1) Channel depth (2) Channel width (3) Channel sinuosity (4) Channel bed (5) Channel banks

Field site 2: Lui Kung Tin Catchwater (Upper course of Kam Tin River)	-	(6) River velocity (7) Load size (8) Water quality (9) Dissolved oxygen (10) Turbidity (11) Natural river/ Engineered channels
Field site 3: River in Wing Hing Wai (Lower course of Kam Tin River)	-	(1) Channel sinuosity (2) Channel bed (3) Channel banks (4) Load size (5) Water quality (6) Dissolved oxygen (7) Turbidity (8) Natural river/ Engineered channels
（Aerial photo）Field site 4: River under Bin Mo Bridge (Lower course of Kam Tin River)	• Observe the photo of Bin Mo Bridge • Observe the meander from the aerial photo	-
Field site 4: River under Bin Mo Bridge (Lower course of Kam Tin River)	-	(1) Channel depth (2) Channel width (3) Channel sinuosity (4) Channel bed (5) Channel banks (6) River velocity (7) Load size (8) Water quality (9) Dissolved oxygen (10) Turbidity (11) Natural river/ Engineered channels

（Aerial photo）Field site 5: New river in the lower course of Kam Tin River near Nam Sang Wai	● Observe the photo of the inflatable dam ● Observe the characteristic of the new channel ● Listen to the voice recording about the Yuen Long Bypass Floodway	-
Field site 5: New river in the lower course of Kam Tin River near Nam Sang Wai	-	(1) Channel sinuosity (2) Channel bed (3) Channel banks (4) Load size (5) Water quality (6) Natural river/ Engineered channels
Field site 6: Old river in the lower course of Kam Tin River near Nam Sang Wai	-	(1) Channel depth (2) Channel width (3) Channel sinuosity (4) Channel bed (5) Channel banks (6) River velocity (7) Load size (8) Water quality (9) Dissolved oxygen (10) Turbidity (11) Natural river/ Engineered channels
(Aerial photos) Field site 6：Old river in the lower course of Kam Tin River near Nam Sang Wai	● Observe the aerial photo of Nam Sang Wai and the old and new Kam Tin River.	-

Data recording sheet

The date of the field study：20/8/2021 **Time**： 10:00am to 6:00pm

Weather of the day (data from the Hong Kong Observatory website)：
Maximum temperature – 32.5°C
Minimum temperature – 27.3°C
Relative humidity – 63-91%
Rainfall distribution – traces of rainfall

The rainfall distribution 3 days before the field study (data from the Hong Kong Observatory website)：
17/8/2021 – 0mm
18/8/2021 – 0mm
19/8/2021 – 34.6mm

	Field site 1： **Natural river in Lui Kung Tin and Kap Lung (Upper course of Kam Tin River)**	**Field site 2：** **Lui Kung Tin Catchwater (Upper course of Kam Tin River)**	**Field site 3：** **River in Wing Hing Wai (Lower course of Kam Tin River)**	**Field site 4：** **River under Bin Mo Bridge (Lower course of Kam Tin River)**	**Field site 5：** **New river in the lower course of Kam Tin River near Nam Sang Wai**	**Field site 6：** **Old river in the lower course of Kam Tin River near Nam Sang Wai**
Measure/ Observation: Channel depth (cm)	1._____ 2._____ 3._____ Average depth =_____ Observation：	1._____ 2._____ 3._____ Average depth =_____ Observation：	_____ Observation：	1._____ 2._____ 3._____ Average depth =_____ Observation：	Observation：	1._____ 2._____ 3._____ Average depth =_____ Observation：
Measure：Channel width (m)						
Observe channel sinuosity						
Observe channel bed	Smooth / Rough	Smooth / Rough	Smooth / Rough	Smooth / Rough	Smooth / Rough	Smooth / Rough

	Field site 1：Natural river in Lui Kung Tin and Kap Lung (Upper course of Kam Tin River)	**Field site 2：Lui Kung Tin Catchwater (Upper course of Kam Tin River)**	**Field site 3：River in Wing Hing Wai (Lower course of Kam Tin River)**	**Field site 4：River under Bin Mo Bridge (Lower course of Kam Tin River)**	**Field site 5：New river in the lower course of Kam Tin River near Nam Sang Wai**	**Field site 6：Old river in the lower course of Kam Tin River near Nam Sang Wai**
Observe channel banks	Smooth / Rough Others (e.g. Vegetation):	Smooth / Rough Others (e.g. Vegetation):	Smooth / Rough Others (e.g. Vegetation):	Smooth / Rough Others (e.g. Vegetation):	Smooth / Rough Others (e.g. Vegetation):	Smooth / Rough Others (e.g. Vegetation):
Measure：River velocity (m/s)	1._____ 2._____ 3._____ Average velocity =_____	1._____ 2._____ 3._____ Average velocity =_____	N/A	1._____ 2._____ 3._____ Average velocity =_____	N/A	1._____ 2._____ 3._____ Average velocity =_____
Observe load size	Size：_____ Shape：_____	Size：_____ Shape：_____	Size：_____ Shape：_____	Size：_____ Shape：_____	Size：_____ Shape：_____	Size：_____ Shape：_____

	Field site 1： **Natural river in Lui Kung Tin and Kap Lung (Upper course of Kam Tin River)**	**Field site 2：** **Lui Kung Tin Catchwater (Upper course of Kam Tin River)**	**Field site 3：** **River in Wing Hing Wai (Lower course of Kam Tin River)**	**Field site 4：** **River under Bin Mo Bridge (Lower course of Kam Tin River)**	**Field site 5：** **New river in the lower course of Kam Tin River near Nam Sang Wai**	**Field site 6：** **Old river in the lower course of Kam Tin River near Nam Sang Wai**
Observe water quality	**River color** clear／green／brown／black **Turbidity** clear／not clear／turbid／very turbid **Algae** none／few／many／so many **Driftage** none／little／much／so much	**River color** clear／green／brown／black **Turbidity** clear／not clear／turbid／very turbid **Algae** none／few／many／so many **Driftage** none／little／much／so much	**River color** clear／green／brown／black **Turbidity** clear／not clear／turbid／very turbid **Algae** none／few／many／so many **Driftage** none／little／much／so much	**River color** clear／green／brown／black **Turbidity** clear／not clear／turbid／very turbid **Algae** none／few／many／so many **Driftage** none／little／much／so much	**River color** clear／green／brown／black **Turbidity** clear／not clear／turbid／very turbid **Algae** none／few／many／so many **Driftage** none／little／much／so much	**River color** clear／green／brown／black **Turbidity** clear／not clear／turbid／very turbid **Algae** none／few／many／so many **Driftage** none／little／much／so much
Measure： **Dissolved oxygen** **(mg / l)**					N/A	

	Field site 1： **Natural river in Lui Kung Tin and Kap Lung (Upper course of Kam Tin River)**	**Field site 2：** **Lui Kung Tin Catchwater (Upper course of Kam Tin River)**	**Field site 3：** **River in Wing Hing Wai (Lower course of Kam Tin River)**	**Field site 4：** **River under Bin Mo Bridge (Lower course of Kam Tin River)**	**Field site 5：** **New river in the lower course of Kam Tin River near Nam Sang Wai**	**Field site 6：** **Old river in the lower course of Kam Tin River near Nam Sang Wai**
Measure： **Turbidity** **（NTU）**					N/A	
Is it a natural river or an engineered channel?	**☐ Natural river** **☐ Engineered channels (If there are any river management strategies, please list the type and function:)**	**☐ Natural river** **☐ Engineered channels (If there are any strategies, please list the type and function:)**	**☐ Natural river** **☐ Engineered channels (If there are any strategies, please list the type and function:)**	**☐ Natural river** **☐ Engineered channels (If there are any strategies, please list the type and function:)**	**☐ Natural river** **☐ Engineered channels (If there are any strategies, please list the type and function:)**	**☐ Natural river** **☐ Engineered channels (If there are any strategies, please list the type and function:)**

Field site	Draw a sketch map / a cross-section of the channel characteristic	Field site	Draw a sketch map / a cross-section of the channel characteristic
Field site 1： Natural river in Lui Kung Tin and Kap Lung (Upper course of Kam Tin River)		**Field site 2： Lui Kung Tin Catchwater (Upper course of Kam Tin River)**	
Field site 3： River in Wing Hing Wai (Lower course of Kam Tin River)		**Field site 4： River under Bin Mo Bridge (Lower course of Kam Tin River)**	

Field site 5： **New river in the lower course of Kam Tin River near Nam Sang Wai**		**Field site 6：** **Old river in the lower course of Kam Tin River near Nam Sang Wai**	

Conclusion

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

Hypothesis: “The more the river management strategies, the higher the flood discharge capacity.”

Is the hypothesis valid? Yes / No

Evaluation

In terms of this inquiry question and hypothesis, describe and explain the possible errors in data collection. Suggest how to redesign the data collection items and methods to raise the validity and reliability of the field study.

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.