



Assessing River Water Quality in a Secondary School Environment

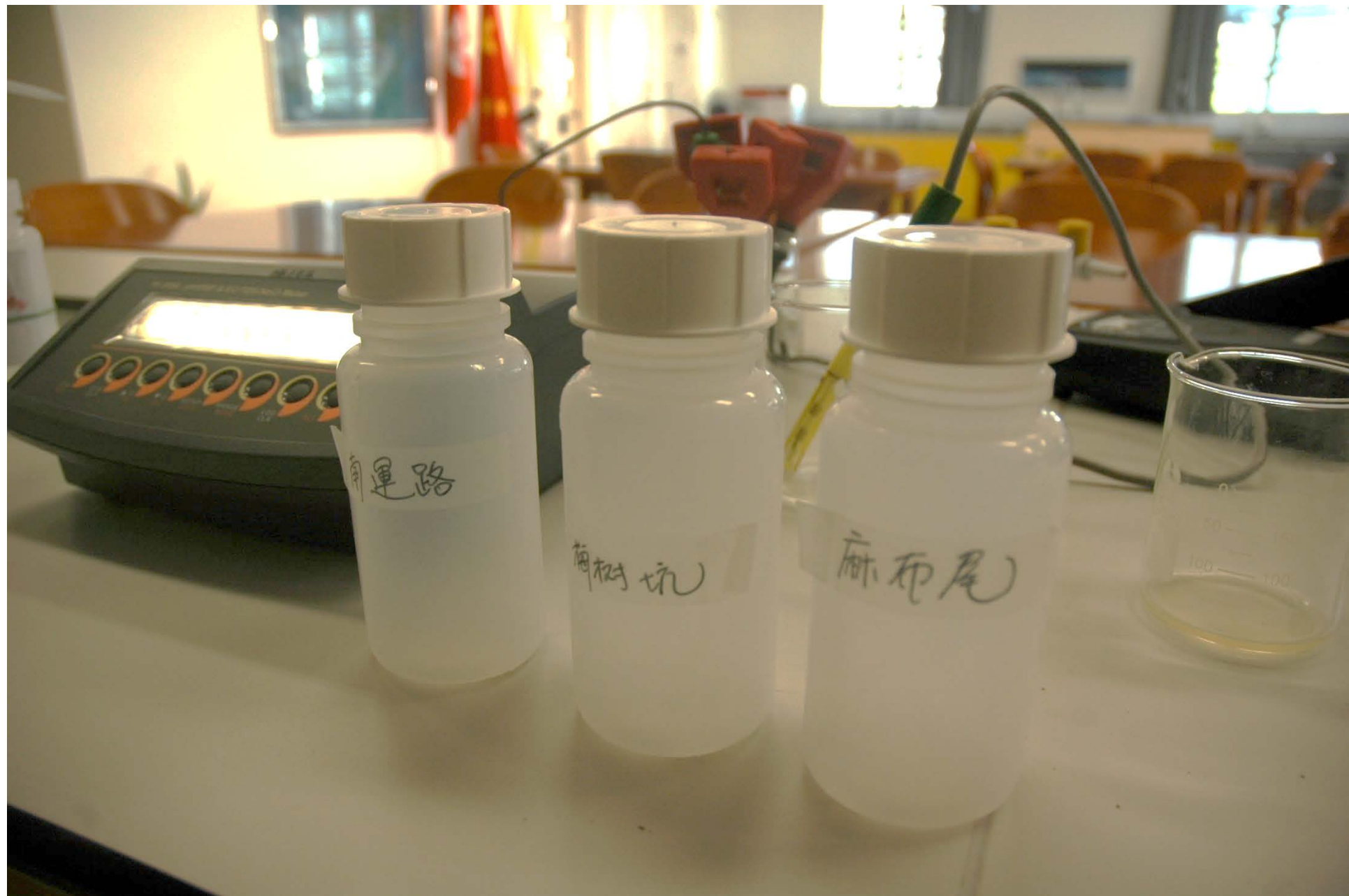
Mr Tony Leung

What can you find in this
bottle of water?

<https://www.wsd.gov.hk/tc/core-businesses/water-quality/my-drinking-water-quality/index.html>

	參數	原因/標準
世衛參數(92個參數)	金屬 (12個參數)	世衛認為對飲用水衛生有重大影響
	農藥 (33個參數)	
	消毒劑 (3個參數)	
	消毒副產品 (14個參數)	
	其他無機化學品 (3個參數)	
	其他有機化學品 (24個參數)	
	微生物 (1個參數)	細菌污染指標
	輻射 (2個參數)	飲用水中放射性水平的篩選參數
非世衛參數 (19個參數)	物理 (4個參數)	一般觀感、物理、化學及微生物等性質的指標
	金屬 (5個參數)	
	其他無機化學品 (7個參數)	
	微生物 (3個參數)	





Temperature



pH



Dissolved Oxygen



Ammonia / Nitrite / Nitrate





Salinity / Total Dissolved Solid (TDS) / Electrical conductivity



Multi-parameters benchtop meter



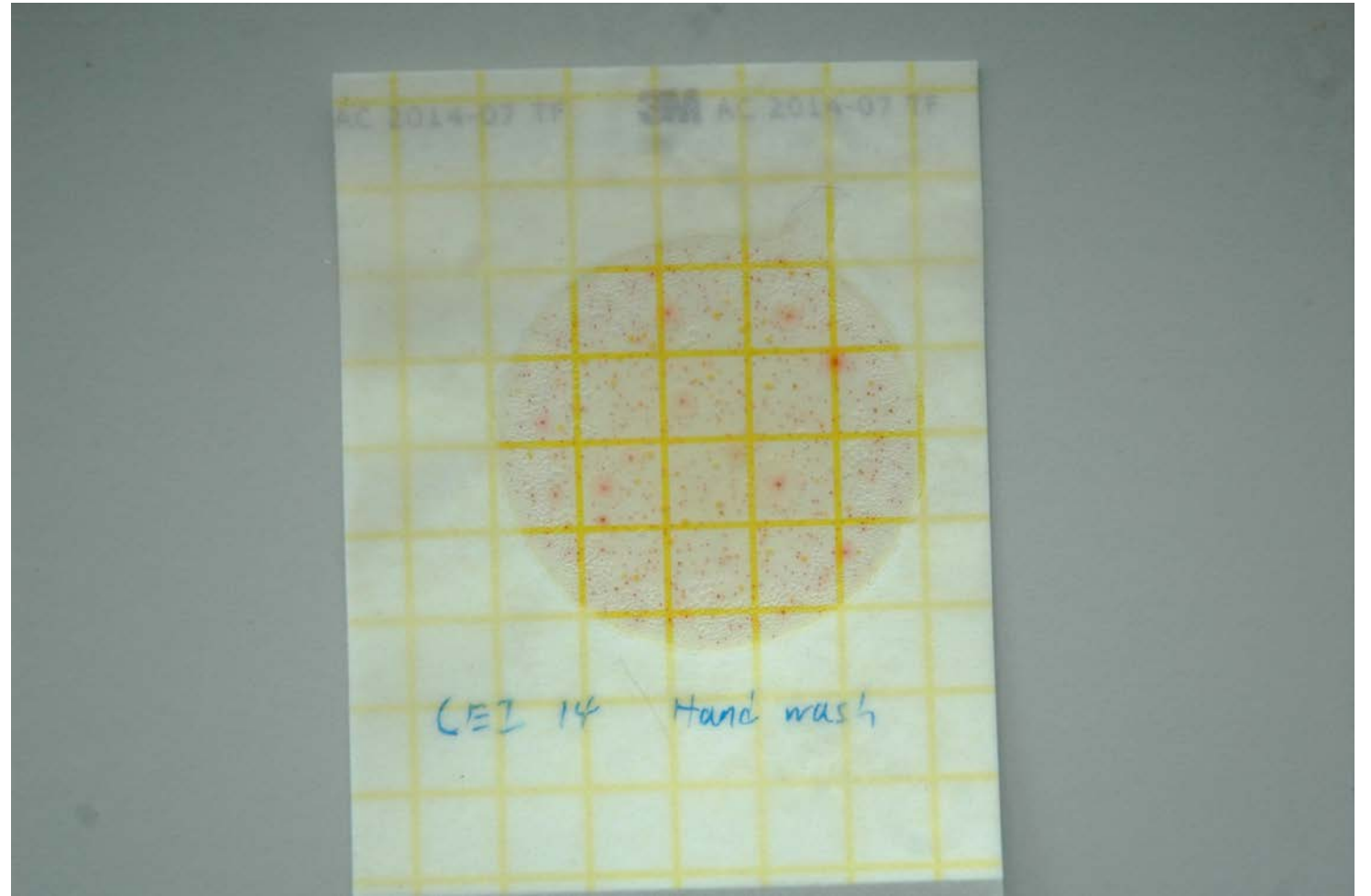
Turbidity / Nickel etc.

Spectrophotometers

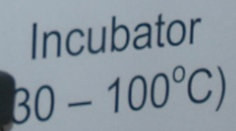


Acid Demand	COD MR	Nitrite
Alkalinity P	COD HR	Nitrogen Total
Alkalinity Total M	Copper	Oxygen Saturation
Alkalinity	Cyanide	Ozone
Aluminium	Cyanuric Acid	pH Value
Ammonia	DEHA	Phenols
Ammonia LR	Fluoride	Phosphate Total
Ammonia HR	Hardness Total	Phosphate
Arsenic	Hazen	Phosphonate
Boron	Hydrazine	Potassium
Bromine	Hydrogen Peroxide	Silica
Cadmium	Iodine	Sulphate
Absorbance	Iron	Sulphide
Monochloramine	Formaldehyde	Sulphite
Chloride	Iron TPTZ	Detergents
Chlorine	Lead	Suspended Solids
Chlorine (total)	Manganese	TOC
Chlorine Dioxide	Molybdate	Turbidity
Chromium	Nickel	Urea
CODLR	Nitrate	Zinc

Escherichia coli / Total bacteria

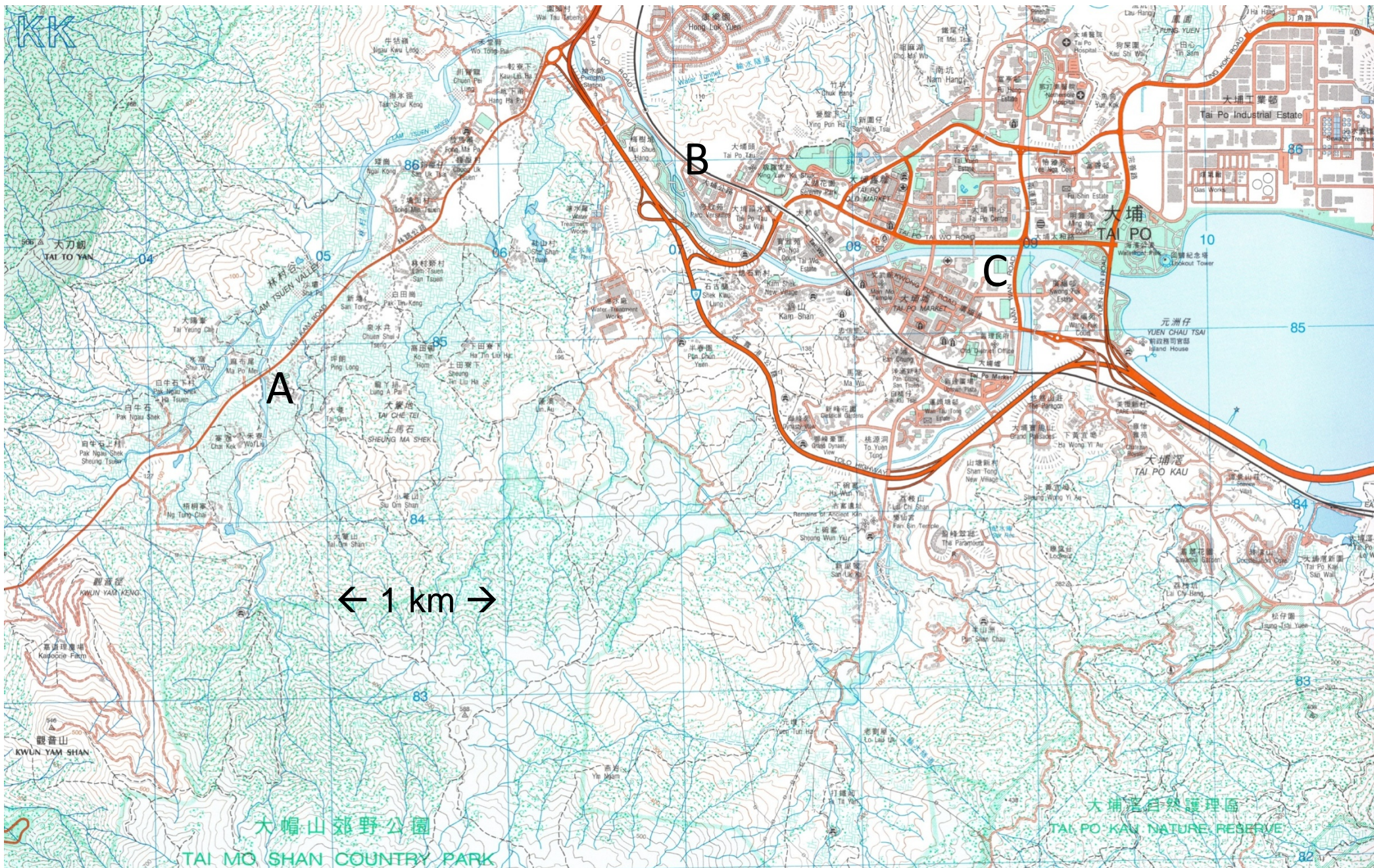


散熱出口置於培養機背面。
培養機運作時，必須保持此窗門打開，
及不要關上窗簾。









	Site A	Site B	Site C
Water temperature (°C)	17.85	18.50	19.36
pH	9.13 *	7.10	7.67
Turbidity (FAU)	1.57 *	4.29 *	3.57 *
Dissolved oxygen (mg/L)	10.00	8.50	8.17
Total Dissolved Solid (ppm)	31.85	94.61	5,545.57 *
Ammonia (mg/L)	0.02	3.25	0.82
Nitrite (mg/L)	0.00	0.15	0.09
Nitrate (mg/L)	0.09	11.36	2.36
Nickel (mg/L)	0.00	0.01	0.02

* Exceed the recommendation of World Health Organization (2011)

Unit: colonies/ 1 ml

Site	<i>Our results</i>	<i>Data from the Government</i>
A	4.64	7.10
B	21.82	20.00
C	428,595.30	500.00

- Temperature
- Salinity
- pH
- Dissolved Oxygen
- *Escherichia coli*
- Total bacteria
- Ammonia
- Nitrate
- Total Dissolved Solid
- Electric conductivity
- Turbidity
- Nitrite
- Nickel
-

In the geography education of secondary schools:

- Investigating whether the river is clean/ potable is meaningless
- Learning happens in
 - Deciding the methodology & sampling sites
 - Testing processes
 - In analyzing the results
- No. of parameters tested depends on:
 - Needs
 - Time & Cost
 - Student ability etc.