Learning, Teaching and Assessment of
School-based Assessment Tasks

Assessment Practices

Meaningful

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What and Why

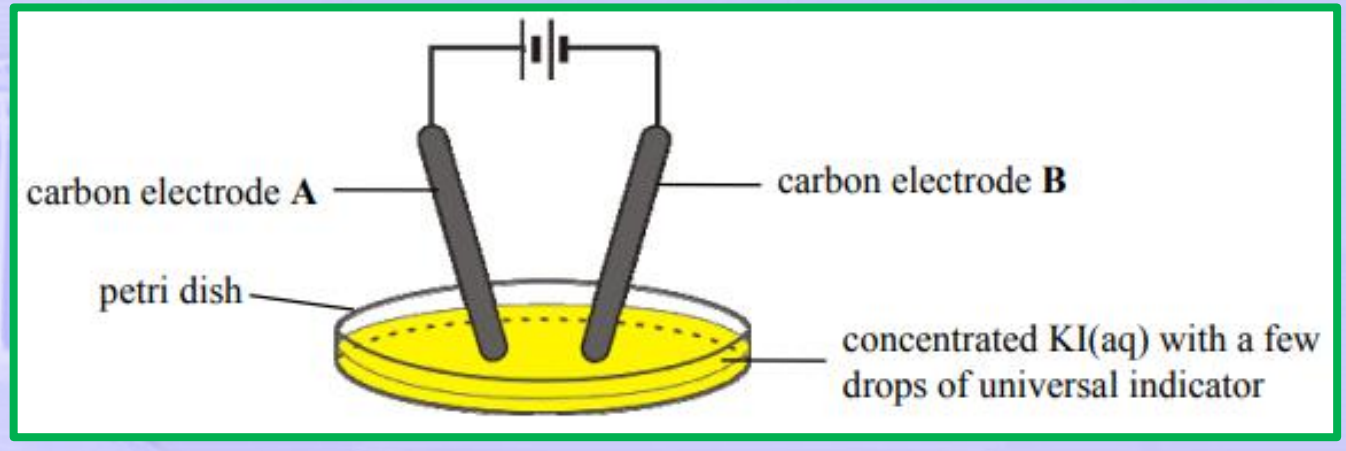
School-based Assessment

- **Role of Students:**
  - **Gaining marks for the public examination**
  - **Learning chemistry**
- **Role of Teachers:**
  - **Managing the practical activities in schools**
  - **Gathering accurate assessment data for HKEAA**
  - **Providing timely and accurate feedbacks to your students**
- **Role of Laboratory Technicians:**
  - **Conducting risk assessment**
  - **Providing appropriate support to students / teachers**

The Easy Way of Learning Chemistry

Effective

The diagram below shows the set-up used in an investigation on the electrolysis of concentrated potassium iodide solution:



(a) State and explain the expected observation around carbon electrode A during the electrolysis.

(b) Would there be any change in observation if carbon electrode B is replaced by a copper electrode in the investigation? Explain.

2013 DSE
Paper 1B
(Topic VII)

What will you do?

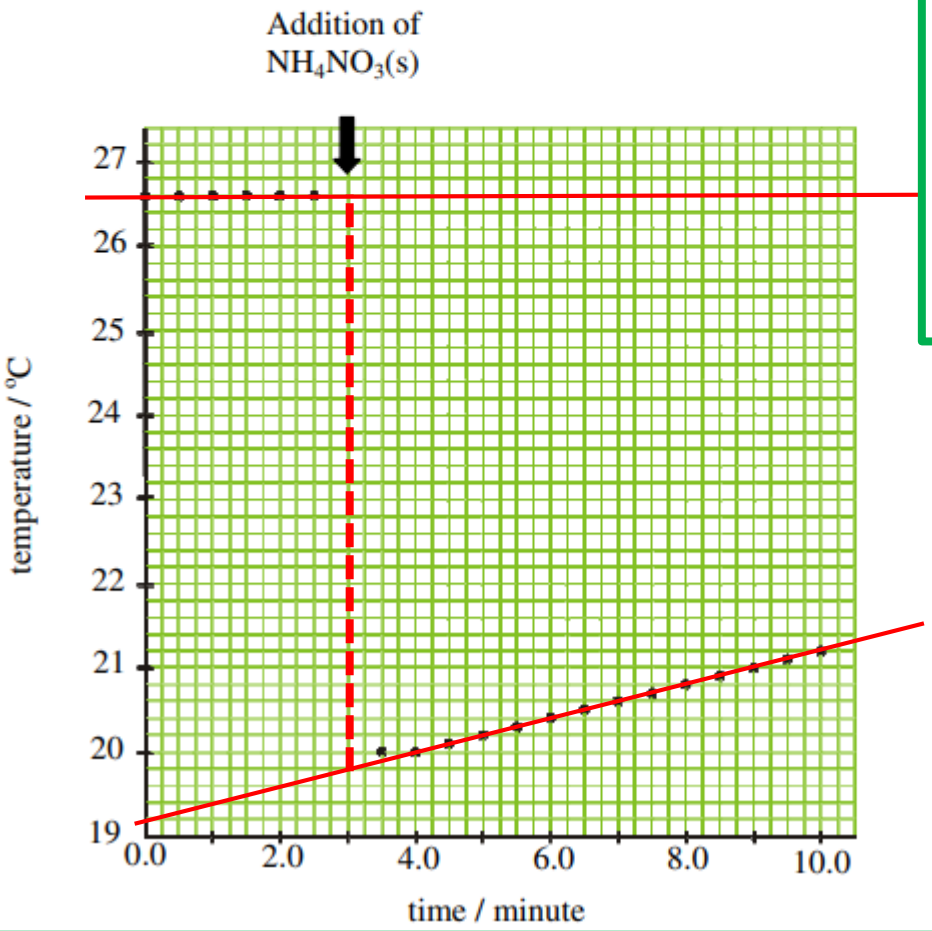
- **Ask your students to memorise all facts and concepts in the electrolysis?**
- **Provide learning experience and help them to make educated guesses? (High Level of Learning – Exploration, Interpretation, Generalisation, …)**
- **In your laboratory:**
  - **Allow different groups of students to explore the chemistry by using different combinations of electrodes / electrodes and observe what happen.**
  - **Make appropriate interpretations, share and discuss.**

The following experiment was carried out to determine the enthalpy change of solution of ammonium nitrate:

$$NH_4NO_3(s) \xrightarrow{H_2O(l)} NH_4NO_3(aq)$$

A certain volume of water was placed in an expanded polystyrene cup. The temperature of the water in the cup was measured with a thermometer at half-minute intervals. Right at the third minute, 2.0 g of $NH_4NO_3(s)$ was added to the cup. The solution in the cup was then stirred thoroughly and its temperature was measured for an additional 7 minutes.

The recordings of temperature are shown in the graph below:

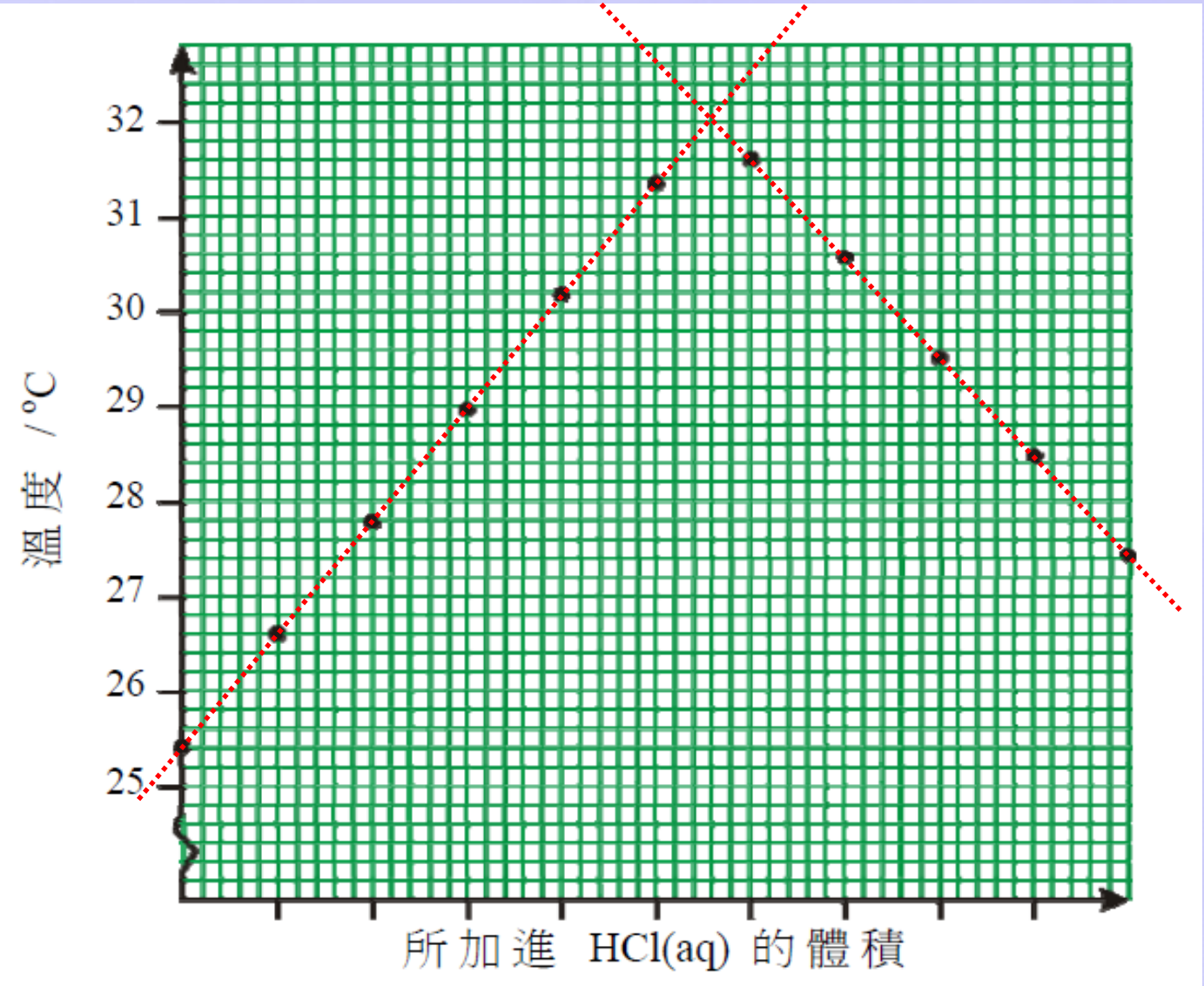


Unfamiliar situation:

How / When / Where to facilitate your students to answer this type of question?

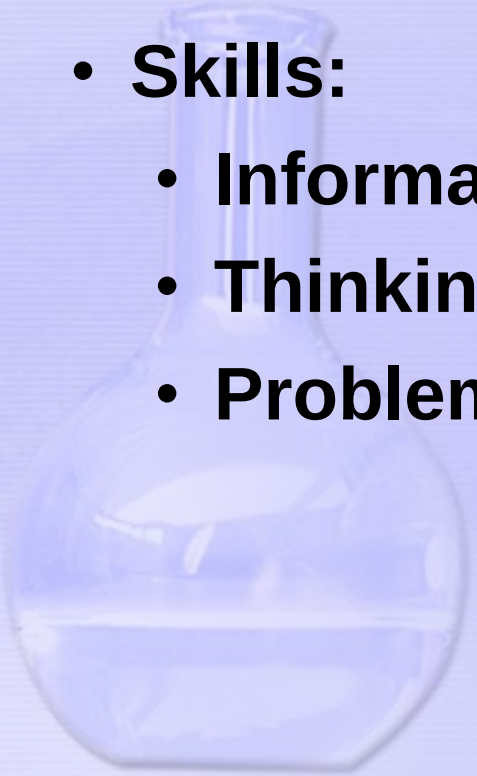
2013 DSE
Paper 1B
(Topic VIII)

甚麼時間可以教授這個技巧？



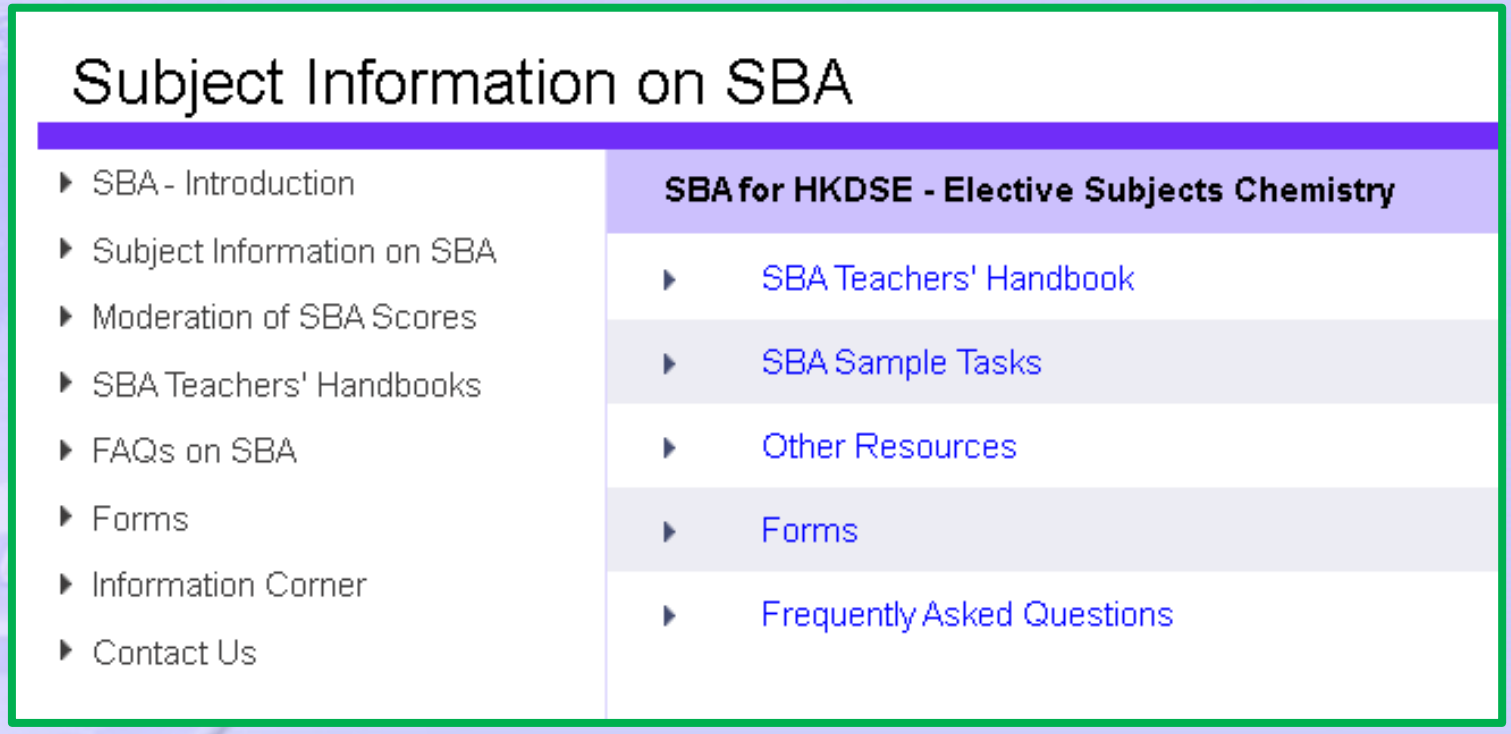
What will you do to address the following?

- **Knowledge:**
  - **Chemistry of this type of experiments**
  - **Mole concept**
- **Skills:**
  - **Information skills**
  - **Thinking skills**
  - **Problem solving skills / calculation**



https://www.hkeaa.edu.hk/tc/sba/sba_hkdse_elective/dse_subject.html?7

HKEAA → HKDSE → Assessment Information → School Information → Subject Information on SBA → Elective Subjects → Chemistry / Combined Science



How

Adopt a Variety of Assessment Methods

	VA	QA	EXPT
	Volumetric Analysis	Qualitative Analysis	Other Experiment
Task c (student		• Detection of cations or anions or both Worksheet	• Perform experiments suggested in the Curriculum and Assessment Guide (other than Volumetric Analysis &
Group/Individual	• ndividual VA • Individual worksheet	• Individual QA • Individual worksheet	• Group EXPT • Individual worksheet/report/quiz
In-class time	80 mins	30 mins	80 mins
Out-of-school time	0 mins	0 mins	0 – 60 mins
Means of assessment (teacher's work)	Mark worksheet	Mark worksheet	Mark worksheet / simple report / detailed report / quiz
	worksheets	Hand in worksheets in class time	Hand in the following in class time: • worksheet / simple report / raw data sheet (if detailed report to be finished at home) AND/OR • quiz

Individual Report

Observations?

Individual Worksheet

Assessment Criteria
(from Chemistry SBA Handbook)

VA

Criteria for assessment of volumetric analysis

Teachers are required to mark the worksheets submitted by their students. Teachers may also assess student performance during practical lessons if circumstances allow. The criteria involved are as follows:

(a) The number of accurate titration readings is adequate and there is an inclusion of the trial run.

(b) There is an accurate detection / recording of colour change.

(c) Calculations are shown clearly and concisely.

- Include a marking criteria for “accuracy”.
- Provide unknown samples of different concentrations to different groups students.
- (Possible?) Ask students to take a snapshot of the end-point and attach it to the report / Ask students to show you the end-point

Ng Ming

Experiment SBA 1

Carry out volumetric analysis using the 0.2 M hydrochloric acid, sodium carbonate solution labelled as 'solution **A**', and an acid base indicator provided. Determine the concentration of solution **A**.

Method

methyl orange / bromothymol Blue

1. Dilute 25.00 cm of solution **A** to 250.0 cm with deionized water.
2. Transfer 10.00 cm of the diluted solution **A** to a conical flask and titrate it with 0.2 M hydrochloric acid using the indicator provided.

Relevant equation

$Na_2CO_3(aq) + 2HCl(aq) \rightarrow 2NaCl(aq) + H_2O(l) + CO_2(g)$

Titration results

Trial Titration

25	Final burette reading / cm^3	24.20	23.35	27.40
2	Initial burette reading / cm^3	1.95	1.00	5.00
23	Volume of titrant / cm^3	22.25	22.35	22.40

- Mean titre = 22.3333 cm^3
- Colour change of indicator: from yellow to pink

Calculations

number of mole of HCl used $= 0.2 \times 22.3333 \times 10^{-3} = 4.46666 \times 10^{-3}$

number of mole of A used $= 4.46666 \times 10^{-3} \div 2 = 2.23333 \times 10^{-3}$

Concentration of **A** = $2.23333 \times 10^{-3} \div 10/1000$

$= 0.223333\ M$

Ho Ming

Experiment SBA 1

Carry out volumetric analysis using the 0.2 M hydrochloric acid, sodium carbonate solution labelled as 'solution **A**', and an acid base indicator provided. Determine the concentration of solution **A**.

Method

methyl orange

1. Dilute 25.00 cm of solution **A** to 250.0 cm with deionized water.
2. Transfer 10.00 cm of the diluted solution **A** to a conical flask and titrate it with 0.2 M hydrochloric acid using the indicator provided.

Relevant equation

$Na_2CO_3(aq) + 2HCl(aq) \rightarrow 2NaCl(aq) + H_2O(l) + CO_2(g)$

Titration results

Trial Titration

	Final burette reading / cm^3	25.3	25.2	
	Initial burette reading / cm^3	3.0	2.8	
	Volume of titrant / cm^3	22.3	22.4	

- Mean titre = 22.35 cm^3
- Colour change of indicator: from yellow to red

Calculations

Concentration of **A** = $\left(0.2 \times \frac{22.35}{1000} \times \frac{1}{2}\right) \div \frac{10}{1000} \times \frac{250}{25}$

$= 2.235\ M$

https://qrgo.page.link/xhGm9

Assessment Criteria
(For VA Accuracy)

VA

Titration Result (as a suggested example):

Marks allocated to result accuracy = 3

- Results **within 1%** error: full mark **(3 marks)**
- Results with **1% – 2%** error: **2 marks**
- Results with **2% - 4%** error: **1 mark**
- Results **larger than 4%** error: **0 mark**

Explicitly include a check box for the accuracy mark in the worksheet

Assessment Criteria
(from Chemistry SBA Handbook)

QA

Criteria for assessment of qualitative analysis

Teachers are required to mark the worksheets submitted by their students. Teachers may also assess student performance during practical lessons if circumstances allow. The criteria involved are as follows:

(a) Results are recorded and described accurately.

(b) Unknowns are deduced in a systematic and logical way.

(c) Due consideration has been given to laboratory safety.

- (Possible?) Ask students to take a snapshot with a digit camera / mobile phone of the chemical test result and attach it to the report.

Expt

Enriching the Assessment Methods

For Other Experiments

Preparative experiments: product yield, accuracy of physical data obtained, quality/appearance of the product obtained.

Kinetic / heat of reaction experiments: consistency / accuracy of the data obtained.

Use a marking guide / scheme & checklist

When

評估計畫

中五
上學期

中五
下學期及中
六上學期

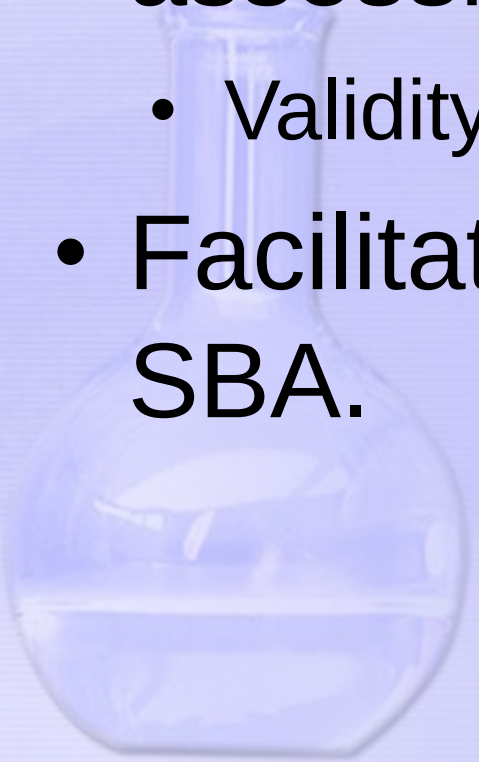
	VA	QA	
	容量分析	定性分析	
作業內容 (學生工作)	● 容量分析 ● 工作紙	● 檢測陰離子或陽離子或二者 ● 工作紙	● 進行課程及評估指引內建議的實驗（容量分析及檢測離子除外） ● 與進行的實驗有關的 工作紙 報告 / 詳盡報告 和 /
小組 / 個人	● 個人 VA ● 個人工作紙	● 個人 QA ● 個人工作紙	PT 工作紙 / 報告 / 測驗
課堂時間	80 分鐘	30 分鐘	80 分鐘
校外時間	0 分鐘	0 分鐘	0 – 60 分鐘
評核方式 (教師工作)	批改工作紙	批改工作紙	批改工作紙 / 簡單報告 / 詳盡報告 和 / 或 測驗
真確性的核證	課堂內呈交工作紙	課堂內呈交工作紙	課堂內呈交以下各項： ● 工作紙 / 簡單報告 / 原數據紙(如詳盡報告須在家中完成) 和 / 或 ● 測驗

中六

計畫通知學生及
實驗室技術員

Key Remarks

- Understand SBA requirements
- Exercise professional judgement in assessment:
  - Validity and Reliability
- Facilitate learning is the key idea in SBA.



https://qrgo.page.link/JsFaz

Evaluation Questionnaire

https://qrgo.page.link/3dePS