

Focus Group on Chemistry Writing Tasks with Specific Genres

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Level of students: S4

Related topics : (Stage 1 : Corrosion and Protection of Metals)
Stage 2 : Preparation of salts

Type of genres concerned:
(Stage 1: Procedural Account & Causal Explanation)
Stage 2 : Procedural Account

Activities to be conducted:
(Stage 1: Writing tasks with genre elements)
Stage 2 : Guided Writing Exercise

Implementation time :
(Stage 1: 19-20 / 1 / 2010 (4 × 40min.))
Stage 2 : 12 / 5 / 2010 (3 × 40min.)

2.1 Brief Notes on Procedural Account

S4A

____ ()
 ____ ()
 ____ ()
 ____ ()
 ____ ()

Common instruction words and typical questions:

- Describe the process of ...
- Outline an experiment using the following equipments and materials...
- Design an experiment using ...

Communicative Function

- To describe in sequence and with accuracy how a scientific activity is to be accomplished

Structure

Parts of the Structure	Functions
Aim	– the desired outcome from following the steps
Steps	– usually numbered or properly sequenced – the sequence usually cannot be reversed – diagrams or illustrations or chemical / mathematical equations (optional)
Result	– brief description of the outcome of the activity

Language Features

Language Features	Examples
• Omit personal pronouns to express objectivity	Personal pronouns: I , We, You, He, She, It, They
• Use verbs to show the steps of the experimental manuals	Add sodium chloride ; Insert two metal strips into the lemon.
• Use passive voice and past tense in the “Steps” and “Result” of experimental reports	Sodium chloride was added .
• Use words expressing time & sequence in the “Steps” to express the connection between steps.	First, second, after that, then, next, finally, eventually, lastly, before, after, in turn, first of all, to begin with, in the first place, while
• Use words expressing cause & effect in the “Steps” and “Result”	Because, because of, due to, owing to, since, as, on account of, cause...to, contribute to, lead to, the reason for, the cause of , as a result, consequently, as a consequence, therefore, hence, thus, when

Sample Text

HKCEE 1999 Chemistry Paper I Question 5 :

The diagram below shows a bottle of chemical waste in a school laboratory. Describe and explain how you would remove kerosene and iron(III) ions from the chemical waste. (You may use any apparatus and chemicals available in a school laboratory.)



<u>Structure</u>	<u>Sample Text</u>	<u>Language Features</u>
<i>Aim</i>	Kerosene and Iron (III) can be separated from the chemical waste in the diagram according to their different physical and chemical properties.	
<i>Step 1</i>	<i>First of all</i> , the liquid waste <u>was added</u> to a separating funnel. <u>Since</u> kerosene and water was immiscible and kerosene was less dense than water, two layers <u>were formed</u> . <i>After that</i> , the lower aqueous layer was removed and the upper kerosene layer <u>was collected</u> .	___ Use passive voice and past tense <i>Use words expressing time & sequence</i>
<i>Step 2</i>	<i>Then</i> , excess sodium hydroxide solution <u>was added</u> to the above aqueous layer until all brown precipitate <u>was formed</u> . The chemical equation is : $\text{Fe}^{3+}_{(\text{aq})} + 3\text{OH}^{-}_{(\text{aq})} \rightarrow \text{Fe}(\text{OH})_{3(\text{s})}$	_____ Use words expressing cause & effect
<i>Step 3</i>	<i>Finally</i> , the mixture <u>was filtered</u> .	
<i>Result</i>	The residue is iron (III) hydroxide. <u>Thus</u> , iron (III) ions are extracted from the waste.	

2.2 Question Analysis

Worksheet 1

Read the following topic carefully, then underline the keywords on the topic to determine the type of genres to be used, and put down the name of the genre in part (1). After that, find the relevant chemical knowledge from textbooks or other ways according to the prompt (a, b, c), and write down the important notes in part (2).

Question :

Describe how large ^a crystals ^b of ammonium sulphate ^c can be prepared from an aqueous solution of ammonia in a school laboratory.

(HKCEE 1995 Chemistry Paper I Question 5)

(1) The writing genre required for the answer: _____

(Hint: descriptive report/ procedural account / causal explanation/ comparison)

(2) Relevant chemical knowledge:

a. _____

b. _____

c. _____

Writing Task 1 :

Aim: Crystals of ammonium sulphate can be prepared from an aqueous solution of ammonia in a school laboratory. **OK!**

Step: **First**, measure the volume of aqueous solution of ammonia and sulphuric acid. An aqueous solution of ammonia was prepared. Mix the solution with ^{excess} sulphuric acid to ensure all ammonia was reacted.

Then, there is a chemical reaction: $2\text{NH}_3 + \text{H}_2\text{SO}_4 \rightarrow (\text{NH}_4)_2\text{SO}_4 + \text{H}_2\text{O}$

After that, ~~filter~~ ^{out} the solid formed after a ~~few~~ period, **no crystallization?**

Next, use distilled water to wash the crystals and then use filter paper to make the crystals dry.

Finally, crystals of ammonium sulphate form, measure the volume crystals.

Result: The residue is crystals of ammonium ammonium.

CK 1
A 0
B 0
C 1 / (2)

Date

Aim: To prepare crystals of ammonium sulphate from an aqueous solution of ammonia.

Steps: ~~First, excess ammonia gas was added into sulphuric acid~~

First, sulphuric acid was added to a test tube.

Then, excess ammonia gas was added into sulphuric acid, so sulphuric acid would be used up by reaction.

Since ammonia and sulphuric acid would form ammonium sulphate, crystals of ammonium sulphate could be obtained from crystallization.

After a period of time, crystals formed, and filtered the solution. Measure the mass of the crystals and recorded it.

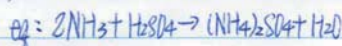
Chemical equation: $2\text{NH}_3 + \text{H}_2\text{SO}_4 \rightarrow (\text{NH}_4)_2\text{SO}_4 + \text{H}_2\text{O}$

CK 2
A 0
B 0
C 1 / (3)

Aim: Prepare crystals of ammonium sulphate from an aqueous solution of ammonia. **OK!**

Step: **First**, add equal volume of sulphuric acid in the ammonia solution.

Then, the solution will have reaction that to form salt and water



Next, ~~burn~~ the mixture solution to get the salt. ~~Because water had evaporation, salt are form.~~ To have process call crystallization. **we want crystals!**

Result: ~~the~~ water had evaporation, just have salt present.

CK 2
A 0
B 0
C 1 / (3)

- or, Titrate ammonia solution with (dilute) sulphuric acid until the end-point is reached. 1+1
conc. X
- or, Add (dilute) sulphuric acid to ammonia solution in mole ratio of 1 : 2 (1+1)
- Evaporate excess water/heat to obtain a ^{concentrated.} saturated solution. (1) 1+1
- Cool slowly/add small crystals of ammonium sulphate the saturated solution to obtain large crystals of ammonium sulphate. 1
- Filter/decant the saturated solution to obtain the crystals. 1
- or, hang a small crystal of ammonium sulphate in the saturated solution as seed to obtain large crystals. (1)
(1)
(6)

Students average score : 3 / 9 M

2.3 Guided Writing

Worksheet 2

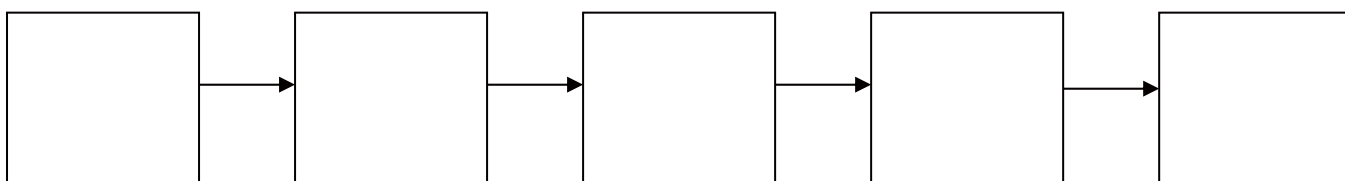
The writing genre required for the following question is “Procedural Account”. Put down the the experimental steps and keywords in the **graphic organizer** provided and draw the experimental setup.

Question :

Describe how large crystals of ammonium sulphate can be prepared from an aqueous solution of ammonia in a school laboratory.

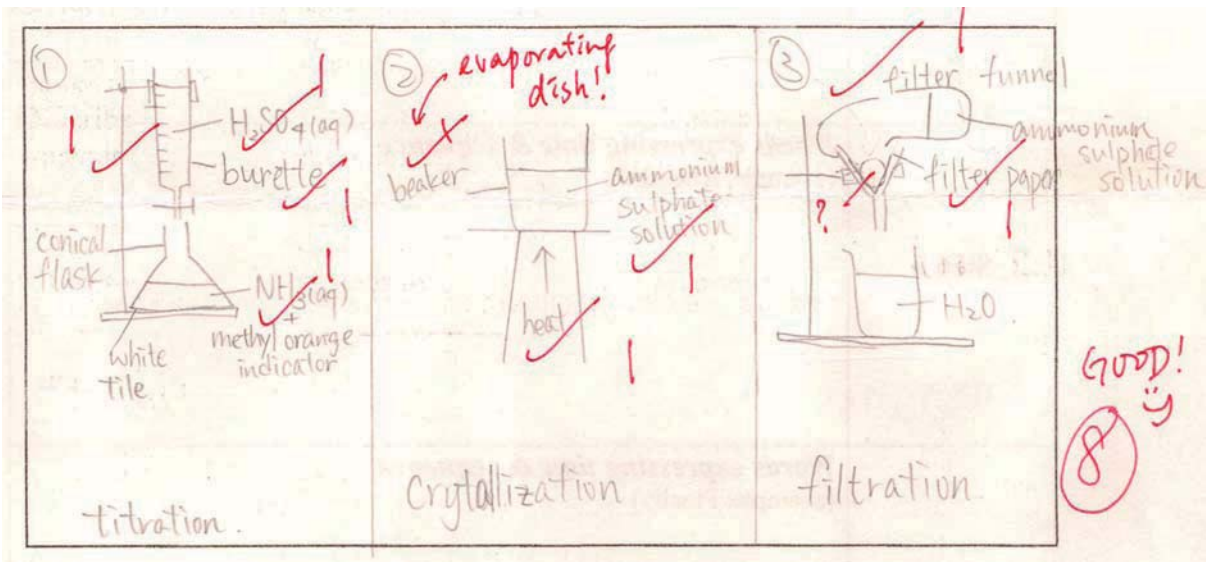
(HKCEE 1995 Chemistry Paper I Question 5)

(1) List the experimental steps in the following graphic organizer:

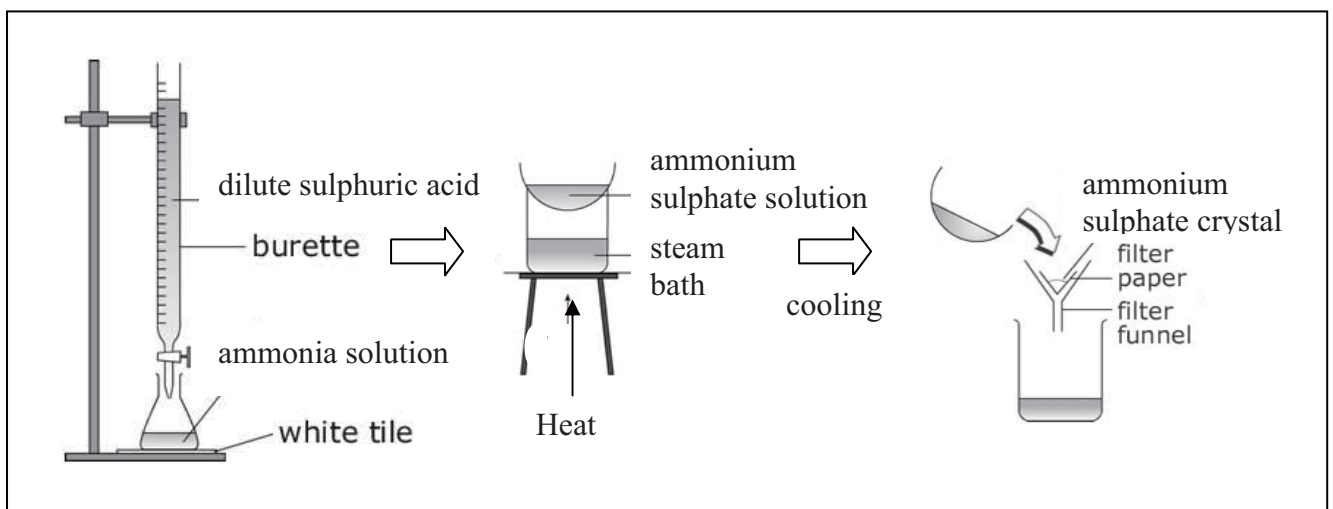
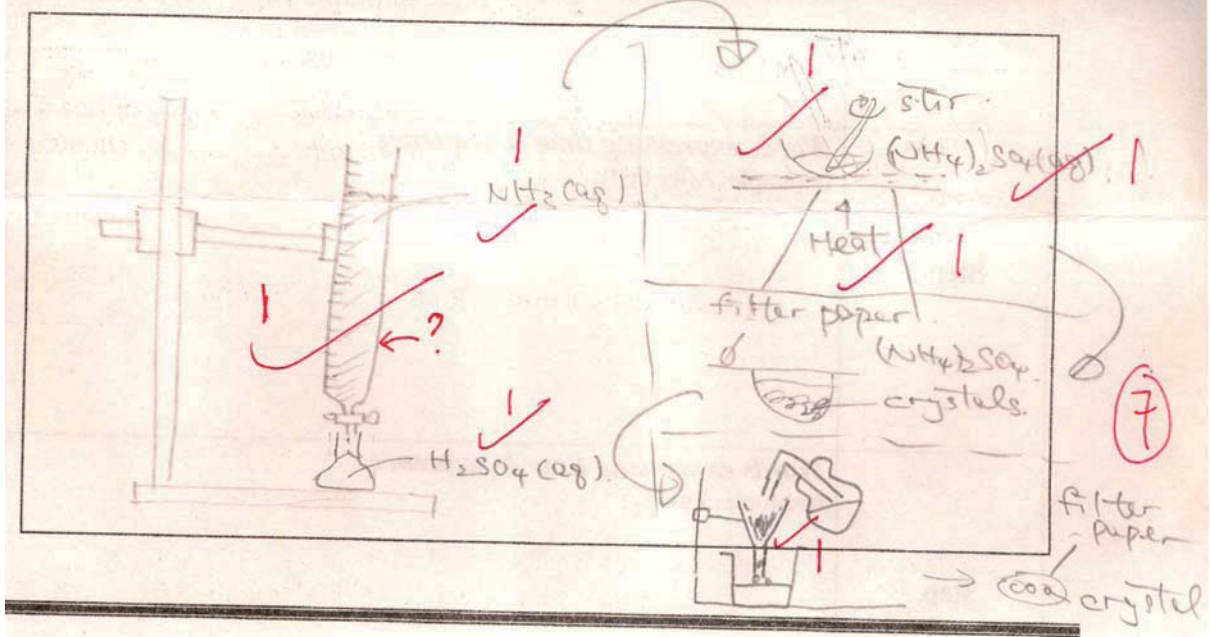


(2) Draw the **experimental setup** in the following box.





(2) Draw the experimental setup in the following box.



2.3 Guided Writing

Worksheet 3

According to the information written in Worksheet 2 and Worksheet 3, answer the question in the following **writing framework**. The framework indicates the paragraphs and the structure of genre. The vocabularies suggested in the framework are the language features commonly used in “Procedural Account”, similar wordings can be used optionally.

Question :

Describe how large crystals of ammonium sulphate can be prepared from an aqueous solution of ammonia in a school laboratory.

(HKCEE 1995 Chemistry Paper I Question 5)

Structure	Essay
Aim	
Step 1	<i>Words expressing time & sequence</i> (example: Firstly)
Step 2	<i>Words expressing time & sequence</i> (example: After that)
Step 3	<i>Words expressing time & sequence</i> (example: Finally)
Result	<i>Words expressing cause & effect</i> (example: As a result)

Aim	<p>Large crystals of ammonium sulphate can be prepared from $\text{NH}_3(\text{aq})$ and $\text{H}_2\text{SO}_4(\text{aq})$ from the school laboratory by neutralization, followed by crystallization and filtration.</p>
Step 1	<p>Words expressing time & sequence (example: Firstly)</p> <p><u>First of all</u>, <u>titrate</u> the $\text{NH}_3(\text{aq})$ ^{with} $\text{H}_2\text{SO}_4(\text{aq})$. $\text{NH}_3(\text{aq})$ reacted with $\text{H}_2\text{SO}_4(\text{aq})$ to give $(\text{NH}_4)_2\text{SO}_4(\text{aq})$.</p>
Step 2	<p>Words expressing time & sequence (example: After that)</p> <p><u>After that</u>, $(\text{NH}_4)_2\text{SO}_4(\text{aq})$ was heated to evaporate H_2O, and $(\text{NH}_4)_2\text{SO}_4(\text{aq})$ became a saturated solution.</p> <p>→ Crystallization!</p>
Step 3	<p>Words expressing time & sequence (example: Finally)</p> <p><u>Finally</u>, put the saturated solution in room conditions to cool down and stayed for a few days. Large crystals were formed. Then filtered the crystals and washed it with a little amount of cool distilled water to wash away the impurities.</p>
Result	<p>Words expressing cause & effect (example: As a result)</p> <p><u>As a result</u>, large crystals were obtained from $\text{NH}_3(\text{aq})$ and $\text{H}_2\text{SO}_4(\text{aq})$ in school laboratory.</p>

C.K 6

A |
B |
C |

Very good!
9
😊

Structure	Essay
Aim	Prepared large crystals of ammonium sulphate from an aqueous solution of ammonia in a school laboratory. Through the following steps:
Step 1	<p>Words expressing time & sequence (example: Firstly)</p> <p>Firstly, use titration set-up.</p> $2\text{NH}_3 + \text{H}_2\text{SO}_4 \rightarrow (\text{NH}_4)_2\text{SO}_4$ <p>titrate NH₃ solution reacts with H₂SO₄ solution to form (NH₄)₂SO₄ by neutralization.</p>
Step 2	<p>Words expressing time & sequence (example: After that)</p> <p>Then, use crystallization set up. Boil the (NH₄)₂SO₄ (aq) to saturated solution of it. cooling down slowly and crystals will form.</p>
Step 3	<p>Words expressing time & sequence (example: Finally) filter</p> <p>Finally, filter the crystal out and dry it by filter paper.</p>
Result	<p>Words expressing cause & effect (example: As a result) are</p> <p>Ammonium sulphate crystals framed. large</p>

C.K. 5

A 0
B 1
C 1

/ (7) Good!
😊

Aim	<u>Describe how large crystals of ammonium sulphate</u> can can be prepared from an $\text{NH}_3(\text{aq})$ in a school laboratory	Rewrite the question <u>Not</u> Copy!
Step 1	Words expressing time & sequence (example: Firstly) <u>Firstly</u> , preparation of the salt by titration. Place 25.0 cm ³ ammonia solution in a conical flask, add two drops methyl orange indicator. Run H_2SO_4 from a burette until to orange colour.	
Step 2	Words expressing time & sequence (example: After that) <u>After that</u> , repeat the same process of step 1 without methyl orange indicator using	
Step 3	Words expressing time & sequence (example: Finally) <u>Finally</u> , heat the ammonium sulphate solution to obtain saturated solution. Leave it in room temperature for few days. Crystals will be formed. Filter the	
Result	Words expressing cause & effect (example: As a result) The residue is crystals of ammonium sulphate.	crystal form an wash then with lit cold disti water can dry it

C.K. 6

A |
B |
C |

/ (9) (Good!)
is

Structure	Essay
Aim	A school laboratory can prepare large crystals of ammonium sulphate through the following reaction between an aqueous solution of ammonia and sulphuric acid:
Step 1	<i>Firstly</i> , ammonia is titrated with dilute sulphuric acid until the end-point is reached, ammonium sulphate solution is obtained.
Step 2	<i>After that</i> , the resulting solution is evaporated to dryness in order to obtain a saturated solution. The solution is then cooled down slowly to obtain large crystals of ammonium sulphate. A small crystal of ammonium sulphate can also be put into the saturated solution as seed to obtain large crystals of ammonium sulphate.
Step 3	<i>Finally</i> , the crystals and the solution are separated by filtration.
Result	<i>As a result</i> , crystals of ammonium sulphate are obtained.

2.4 Suggested Topics of Chemistry Writing Assignments

2.4.1 Questions with Effective Communication in HKCEE Chemistry Paper I - Procedural Account

Question		Curriculum Topic
CE 95 Q5	Describe how large crystals of ammonium sulphate can be prepared from an aqueous solution of ammonia in a school laboratory.	Neutralization & Salts
CE 96 Q4	Briefly describe an experiment, using the following apparatus and materials, to show that air is necessary for the rusting of iron. 2 test tubes, a test tube holder, a Bunsen burner, 2 clean iron nails, paraffin oil and tap water	Corrosion & Protection of Metals
CE 97 Q4	Briefly describe how you would conduct an experiment, using the materials and apparatus listed below, to nickel-plate a clean metal spoon. (Diagrams are NOT required.) State the expected observation of the experiment. A clean metal spoon, a nickel plate, nickel(II) sulphate crystal, a large beaker of distilled water, a d.c. power supply and connecting wires	Electrolysis
CE 98 Q5	Each of the five unlabelled bottles contains one of the following chemicals : 2M hydrochloric acid 2M nitric acid 2M sodium chloride solution 2M sodium hydroxide solution distilled water Suggest how you would carry out tests to identify the contents of each bottle, using the material and apparatus listed below. Your answer should include the observation of each test. Copper foil, solid copper(II) carbonate, 2M copper(II) chloride solution, test tubes and a Bunsen burner. <i>(You are NOT required to write chemical equations. Answer in the form of flow diagram will NOT be marked.)</i>	Neutralization & Salts + Detection of substances
CE 99 Q5	The diagram below shows a bottle of chemical waste in a school laboratory. Describe and explain how you would remove kerosene and iron(III) ions from the chemical waste. <i>(You may use any apparatus and chemicals available in a school laboratory.)</i>	Separating Mixtures + Detection of substances
CE 00 Q4	The mass of a sample of copper powder contaminated with copper(II) oxide is known. Describe how you would conduct an experiment to determine the percentage by mass of the copper powder in the sample. State the expected observation of the experiment. <i>(Hint: You may use an acid in the experiment.)</i>	Neutralization & Salts
CE 05 Q7	A chemical cell can be made from two metal strips and a lemon. Given the following materials and equipment, outline how you can set up a chemical cell with the maximum output voltage. “a lemon, a copper strip, a magnesium strip, a zinc strip, a multimeter and several connecting wires” <i>(Your answer should include variables that need to be controlled.)</i>	Reactions in chemical cells
CE 05 Q12	There are four unlabelled reagent bottles each containing one of the white solids listed below : ammonium chloride, ammonium nitrate, sodium hypochlorite and sodium sulphate Suggest how you would carry out tests to distinguish the four solids from one another.	Detection of substances
CE 06 Q12	You are provided with the following materials : Magnesium ribbon and 2 M hydrochloric acid Design an experiment to determine the molar volume of hydrogen at room temperature and pressure. <i>(You may use apparatus commonly available in a school laboratory.)</i>	Simple volumetric works involving acids & alkalis

2.4.2 Suggested Topics for NSS Chemistry and NSS Combined Science (Chemistry) Curriculum -- Procedural Account

Suggested Writing Topic	NSS Chemistry Curriculum	NSS Combined Science (Chemistry) Curriculum
Design an experiment how to test for calcium carbonate.	Topic I Planet Earth	Topic I Planet Earth
Describe how to investigate the migration of ions of aqueous solutions (e.g. copper(II) dichromate and potassium permanganate) towards oppositely charged electrodes.	Topic II Microscopic World I	Topic II Microscopic World I
Design an experiment how to investigate factors that influence rusting.	Topic III Metals	Topic III Metals
Describe briefly an experiment to find the molarity of hydrochloric acid using acid-base titration.	Topic IV Acids and Bases	Topic IV Acids and Bases

Thank you!