



CoCards ' Technique: A Method to Enhance Students' Ability to Determine Cations in Salts

Lee Saw Im

Excellent Teacher - Chemistry

H/P: 012-6963982

Office: 03-92837924

Fax No: 03-92837887

Email: sawim2@yahoo.com





- CoCards Action Research
- CoCards worksheets
- CoCards Activities
- CoCards reflection





Abstract

- *This research was carried out to determine the problems faced by Form 5 chemistry students in understanding a subtopic on cations.*
- *It involved 31 students from 5 Science Omega, SMK Seri Bintang Utara, a secondary school in Kuala Lumpur.*
- *Preliminary a study was carried out by studying students' achievement in the intervention examination and also through interviews with ten students.*





Abstract

- *The results of the examination and the interviews showed that students were facing difficulties in memorising the colours of precipitates and solutions*
- *They were unable to predict the anions based on their observation of chemical reactions and they also found it difficult to write a balanced chemical reaction.*
- *Some of them also faced problems in determining the solubility of salt and they claimed that it was difficult to memorise the preparatory steps of dry crystals*





Abstract

- Hence, *CoCards* was introduced to students to increase their ability to recognise cations.
- Students were exposed to the *CoCards* for 20 minutes during lessons and the research is carried out within a duration of 2 weeks.
- The results show that after using *CoCards*, students are now better at understanding, memorising, and analysing the ions in salts





1.0 REFLECTION ON PREVIOUS TEACHING AND LEARNING

- ❖ When I was marking the 5 Science Omega's students' Intervention 2' answer scripts, I was shocked to find out that 13 percent of them left the question blank, 81 percent obtained 1 mark, 33 percent got 2 marks and the other 3 percent obtained 4 marks.
- ❖ The full marks for that particular question were 10 marks. The most popular question which involved the gas that is able to turn lime water cloudy was successfully answered by 87 percent of the students. I was very upset when I was marking their paper because I had gone through the revision process with them twice in January and February.





- ❖ During the revision process, I also taught some **memorising tips such as using acronym**. Practices for writing a balanced equation has also been constantly carried out during the teaching and learning process.
- ❖ The students are **unable to answer questions that require them to predict and analyse** such as determining the cations based on observations or through chemical reactions. **80 percent of them also do not exhibit answering techniques**
- ❖ For instance, for questions that require students to name the chemical compounds, some of the students will either give inaccurate answers or will name the chemicals in the form of formula.





- ❖ They were unable to answer questions that required them to write a balanced equation because they couldn't name the reaction and they did not know the products of the reaction.
- ❖ They told me they were going to study even harder for their diagnostic examination, to be held in May.





❖ When I reflect upon the situation, I figured out that the topic on Salts is not popular among students because they are required to memorise

- the colours of precipitate, solutions, gases
- the observations when a reagent is used to test for the presence of certain ions.





- ❖ Besides that, a large number of students did not attend school when the topic was taught at the end of the previous year because they had stayed home to prepare for their final examinations.
- ❖ Thus, a few questions arose and puzzled me.
 - Do I need to repeat this topic?
 - Is there enough time for me to do this?
 - Is it possible for me to settle this problem and complete the Form 5 Chemistry syllabus on time?





- ❖ When I asked the students to explain their poor performance, they told me that:
 - they do not like questions on Salts,
 - they do not know how to write a balanced chemical equation,
 - they cannot remember the colours of chemicals,
 - they had not revised the lesson thoroughly
 - they were not ready for the test.





- From my point of view, I think that their weakness is that **they are not able to memorise the colours of certain chemicals.**
- ❖ This made them unable to name the chemicals, give the correct observation and write balanced and correct chemical equations.
 - ❖ If I do not curb this problem, I am certain that they would not be able to answer the objective, structural and essay questions in the examination.





2.0 ISSUES THAT REQUIRE ATTENTION

- ❖ Although I discovered that my students faced a lot of problems in mastering this particular topic in chemistry, I will only focus the research on the difficulties that they face in **determining the cations in salts**.
- ❖ My students **are not able to remember the colours of chemicals**.
- ❖ They are also **unable to conduct analysis based on information that is provided**.
- ❖ Besides this, they also have difficulties in naming the **products of the chemical reactions** and **predicting the ions in precipitates and solutions**.





Furthermore, carrying out analysis based on a chemical test on a given solution also posed some difficulties for them. Fortunately, the majority of the students had excellent command of the English Language.

- ❖ Therefore, just by helping my students to memorize the colours of cations in salts, I am certain that they can determine the cations in salts accurately and they will be able to write balanced chemical equations.
- ❖ With this, I hope they will be able to answer the objective, structure and essay questions in the MCE.





Floating market in Hyatt



- Creative
- Inovative





3.0 FOCUS OF THE STUDY

- ❖ This research aims to improve students' ability to determine cations in salts.





4.0 OBJECTIVES OF THE STUDY

Students will be able

- to determine the cations in solids
- to determine cations based on the colour of solids
- to determine cations based on the colour of solutions
- to determine cations based on chemical tests

Increase the percentage of students who obtain an 'A+' in chemistry in the MCE.





5.0 TARGET GROUP

- The research involved 31 pupils from 5 Science Omega class.





6.0 PROGRESS OF RESEARCH





6.1 Determining the problems

- Before proceeding with the next steps, I carried out a baseline study in order to fully understand the situation.
- **Ten students were interviewed** to learn more about the problems they faced after sitting for the 2nd Intervention Assessment.
- **Observations are also carried out during the teaching and learning process** in class to see whether students are interested in chemistry.





6.2 Early observations

- I observed the students' behaviors during the teaching and learning process before and after the research is carried out.





6.3 Pre-test

- Pre-test is given to the targeted groups to assess students' understanding and ability to solve problems in determining ions in salts.
- After marking their papers, I did not discuss the questions with my students.
- On the other hand, I introduced the “CoCards” techniques to the targeted students.





6.4 Post-test

- After introducing the “CoCards” technique for two weeks, a post-test was carried out.
- The questions for the post-test were similar to the pre-test.





6.5 Interviews and questionnaires

- Ten students were interviewed to find out the factors that hindered their full understanding of the technique of determining cations in salts.
- Questionnaires were also prepared and distributed to students to obtain students' feedback on cations in salt after the “CoCards” were introduced.
- I also asked my colleagues about the usage and effectiveness of “CoCards”.





7.0 ANALYSIS OF THE PROBLEM

- ❖ It was found that although students completed their exercises and assignments, **they could not give the colours of solids and solutions accurately.**
- ❖ They also could not give the names and the formula of the ions in salts precisely.
- ❖ It was discovered that **most students did not answer the question at all.**
- ❖ **Only a few students tried to answer them but eventually gave the inaccurate answers.**





7.0 ANALYSIS OF THE PROBLEM

- ❖ The actual problem that the students were facing was that they did not know the concept well enough to:
 - determine the cations based on the colours of solid
 - determine the cations based on the colours of solutions
 - determine the cations based on chemical tests





7.1 Results of Observation

- Based on the observations that were carried out after the research was done on the targeted groups, it was found that:
 - Students showed a more confident and exciting facial expression when questions were posted in class. They were enthusiastic for more challenging questions and they were all eager to participate in the lesson.
 - Students can determine the cations in salts whether in the form of solid or solution.
 - The teaching and learning process became a two way communication and became more interactive.





7.2

Analysis of the pre-test and post-test

Table 1:

Comparison of students' scores

Marks	Pre-test		Post-test	
	No	Percentage	No	Percentage
0	4	12.9%	0	0
1	25	80.6%	0	0
2	1	3.2%	0	0
3	0	0	0	0
4	1	3.2%	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	2	7.7%
8	0	0	7	26.9%
9	0	0	15	57.7%
10	0	0	2	7.7%
Absent	0	0	5	
Total	31		31	





7.2

Analysis of the pre-test and post-test

Table 1:

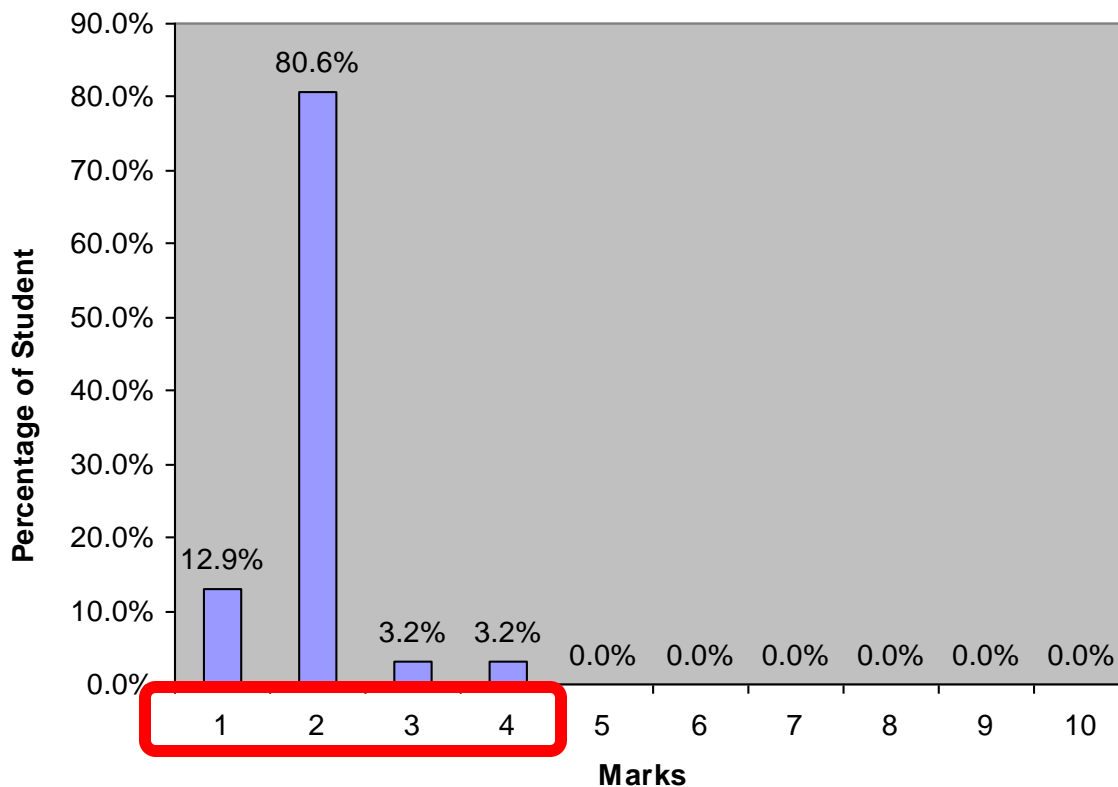
Comparison of students' scores

Marks	Pre-test		Post-test	
	No	Percentage	No	Percentage
0	4	12.9%	0	0
1	25	80.6%	0	0
2	1	3.2%	0	0
3	0	0	0	0
4	1	3.2%	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	2	7.7%
8	0	0	7	26.9%
9	0	0	15	57.7%
10	0	0	2	7.7%
Absent	0	0	0	0
Total	31		31	





Chemistry Pre Test 5 Science Omega

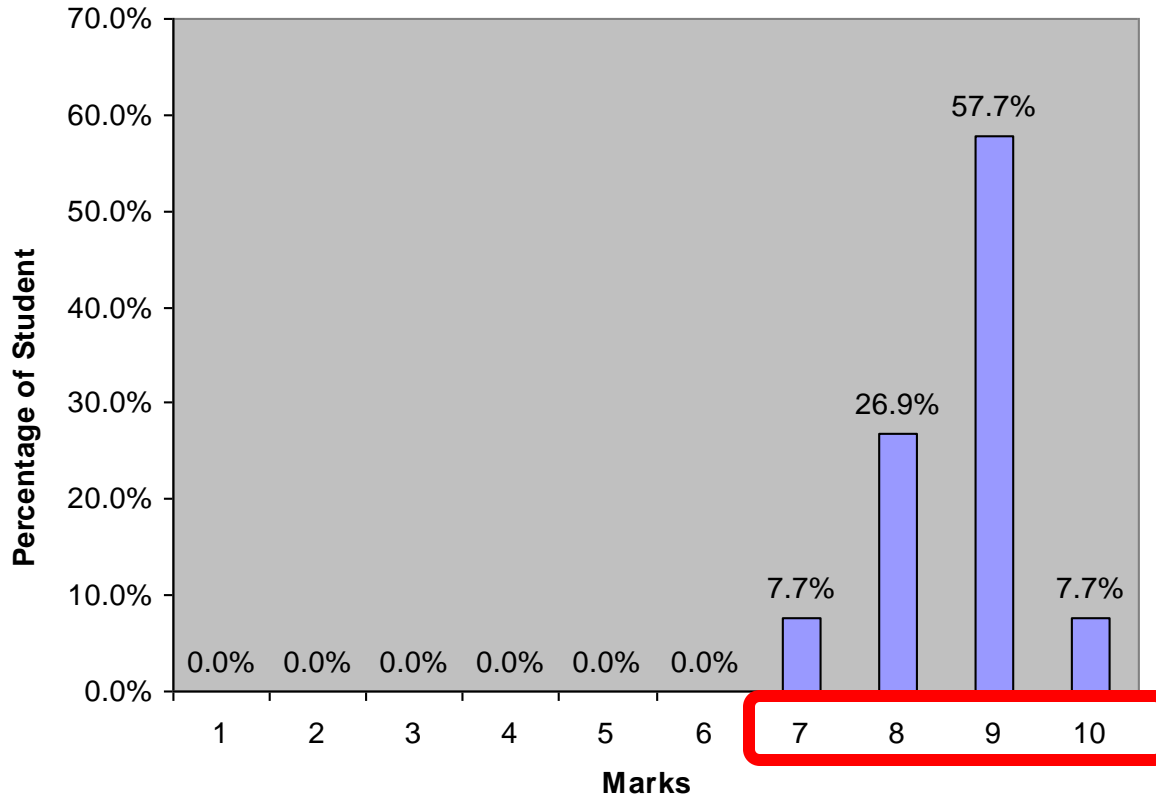


Graph 1: Analysis of pre-test





Chemistry Post Test 5 Science Omega



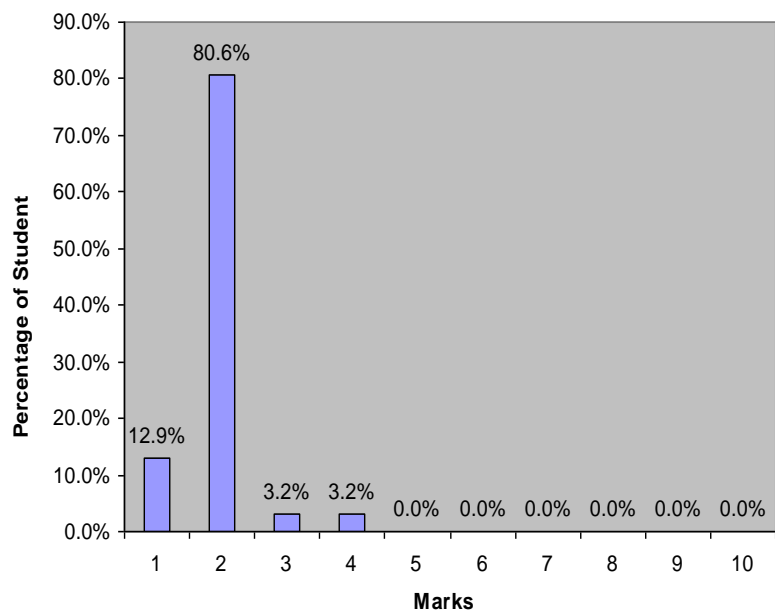
Graph 2: Analysis of post-test



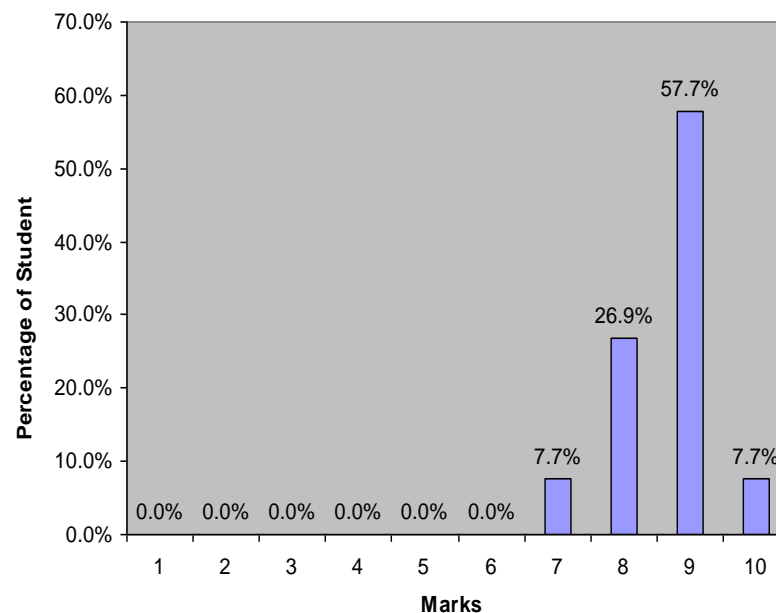


Comparison of students' scores

**Chemistry Pre Test
5 Science Omega**



**Chemistry Post Test
5 Science Omega**



Graph 1: Analysis of pre-test

Graph 2: Analysis of post-test





- Result from the post test clearly shows that there is a **significant increase in students' performance**.
- This proves that “**CoCards**” is an effective tool in helping students to understand and increase their ability to analyse cations in salts.
- The interest, self satisfaction and the will to learn has clearly increased.
- Students also want me to plan and carry out more special teaching and learning techniques with them to increase their knowledge of chemistry.





7.3 Analysis of interviews

- Students gave positive responses whereas teachers gave constructive comments. Stated below is the analysis of interviews carried out on students.

Scale: 1 – Strongly disagree
 2 – Disagree
 3 – Partially agree
 4 – Agree
 5 – Strongly agree



**Table 2:***Interview Responses*

No	Scale	1	2	3	4	5	Total
1	Chemistry is an easy subject	0	0	9	22	0	31
2	I prefer my own memorising techniques compared to the “CoCards” technique	2	5	6	15	3	31
3	Salt analysis is an easy topic to learn without the aid of “CoCards”	8	3	4	8	8	31
4	I find it easier to understand salt analysis after my teacher introduced “CoCards” to me	0	0	4	5	22	31
5	I find it easier to memorise salt analysis after my teacher introduced “CoCards” to me	0	0	5	4	22	31
6	I find it interesting learning salt analysis by using “CoCards”	0	0	2	11	18	31
7	I will use “CoCards” technique in other chemistry’s topics	0	0	11	9	11	31
8	I will use “CoCards” technique in other subjects	0	0	10	14	7	31
9	“CoCards” technique helped me to reduce my phobia towards answering salt analysis questions	0	0	8	17	6	31
10	“CoCards” technique helped me in increasing my ability to analyse salt	0	0	6	16	9	31



Chemistry teachers' comments:

- “...A very interesting technique
- “...Effective usage of colours successfully attracts the attention of students towards questions”
- “...Effective usage of colours can enhance students' memories in memorising the colours of different types of chemical substances”





8.0 IMPLEMENTATION OF THE PROGRAMME

The activities are:

- Who Am I?
- Identify Me By NaOH
- Identify Me By NH_3
- It's Me!





Activity 1: *Pre-test*

- After students had taken the pre-test, I divided them into 6 groups led by students with the highest score in the pre-test.
- I gave a briefing about the “CoCards” techniques and also encouraged students to answer questions on determining the ions in salts.
- I also told them about the importance of colours in life by quoting Tony Buzan:
“people are 80 percent more likely to remember what they read if it’s in colour.”





Activity 2: *Who Am I?*

- ❖ In this activity, a few samples of salts and salt solutions together with cards that were in white, blue, green and brown (which are known as CoCards) were prepared at each station.
- ❖ In the end, students were able to determine the relationship between the ions present in salts and their respective colours.
- ❖ This activity is simple and interesting because actual substances are used and this further enhances the students' interest.
- ❖ It was this interest that continues to motivate the students to explore the world of chemistry through the *Identify Me By NaOH* activity.





Activity 3: *Identify Me By NaOH*

- ❖ The “CoCards” technique is also used for the *Identify Me By NaOH* activity.
- ❖ The students wrote down the names of the cations based on their observation of the chemical reactions between sodium hydroxide solution and various types of salt solutions.
- ❖ The results of the activities were compared with the results from the Who Am I? activity.
- ❖ It is found that the actual colour of the product formed by the chemical reactions between sodium hydroxide and the salt solutions really enhanced students’ knowledge towards predicting the cations in salts.





Activity 4: *Identify Me By NH₃*

- ❖ A worksheet which contains observation when a salt solution is tested by using ammonia aqueous, NH₃ is given to students.
- ❖ They analyse and record the name of cation ions by using the information stated in the cocards in previous activities.
- ❖ Oral evaluation is conducted by observing the colour of cocards shown by students.
- ❖ All students are able to show the correct cocards when asked to predict the colour of a salt solution using ammonia aqueous, NH₃.





Activity 5: *It's Me!*

- ❖ ICT facilities were used to display all the tests on cations in salts.
- ❖ Flowcharts were given to students.
- ❖ Students used their knowledge gained through *Who Am I?*, *Identify Me By NaOH* and *Identify Me By NH₃* activities to complete the flow charts.
- ❖ To further enhance students' ability to use the "CoCards" technique, a meeting that involved all chemistry teachers was conducted.
- ❖ This technique was shared with other chemistry teachers and they gave creative ideas and opinions to improve the "CoCards" technique.





9.0 RESEARCH REFLECTION





9.1 Implementation of Program and Observation/ Evaluation

- The research was carried out over a period of two weeks.
- While carrying out this research, **I managed to complete the school syllabus** to ensure that the students are able to sit for the standardized Diagnostic Examinations.
- I have to ask the school administrators for permission to take the targeted groups' free periods to carry out the "CoCards" research.
- The students were also involved in post-test.





- After the post-test, students were required to fill in the questionnaires so that I will able to know their opinions and suggestions.
- Questionnaires were administered so that students would feel more comfortable responding to the questions, compared to face-to-face interviews.
- I also explained the “CoCards” technique and concept to other chemistry teachers and I got favourable feedback from them.





- Based on my observation, the “CoCards” technique has successfully helped students in determining ions in the salts topic.
- Students are now able to answer salts-related questions confidently.
- This situation was fully portrayed by their cheerful expressions and their lifting voices as they were answering questions.
- Moreover, they were competing against each other to answer the questions asked by teachers.





- Based on my observation, the “CoCards” technique has successfully helped students in determining ions in the salts topic.
- Students are now able to answer salts-related questions confidently.
- This situation was fully portrayed by their cheerful expressions and their lifting voices as they were answering questions.
- Moreover, they were competing against each other to answer the questions asked by teachers.





- Furthermore, the use of “CoCards” among students also caused students to improve their understanding of chemistry and their ability to score well in the standardized Diagnostic Examinations.
- Besides that, there is a healthy metamorphosis in the students’ behaviours during chemistry lessons after “CoCards” was introduced.





- After carrying out the research, I felt very satisfied.
- This is because the “CoCards” technique is very different from the usual teaching methodology and it gave a great impact on teachers and students.
- There were even students that came to me and asked me if there would be such classes in the future.
- From my point of view, I found out that the initiative and support of teachers are crucial toward a student’s success.

Reflection





10.0 SUGGESTIONS FOR THE NEXT RESEARCH

- ❖ For the upcoming research, I plan to use the “CoCards” technique for other suitable topics in chemistry.
- ❖ Topics that are suitable for the “CoCards” technique are carbon compounds, oxidation and reduction.
- ❖ From my perspective, the use of coloured cards is able to attract students’ interest in memorising chemical reactions and its observations.





10.0 SUGGESTIONS FOR THE NEXT RESEARCH

- ❖ The joy in learning will allow students to attain greater heights in the future.
- ❖ The upcoming research will also overcome the shortcomings of “CoCards” such as printing the formulae of ions beforehand.
- ❖ The names or formulae of ions will also be pasted in their respective boxes.
- ❖ By using these techniques, there will be no reason or excuse for a student to be unable to answer questions on chemistry.





- CoCards Action Research
- Cocards worksheets
- CoCards Activities
- CoCards reflection





.com

T

H A N K

Y O U

U

U

WALK TO CONSCIOUSNESS
2005

WALK TO CONSCIOUSNESS
2005

WALK TO CONSCIOUSNESS
2005

WALK TO CONSCIOUSNESS
2005

WALK TO CONSCIOUSNESS
2005

WALK TO CONSCIOUSNESS
2005

WALK TO CONSCIOUSNESS
2005

WALK TO CONSCIOUSNESS
2005