PEDAGOGY FOR LEARNING BASIC CHEMISTRY CONCEPTS

22 JUNE 2015

AIMS

1. To discuss strategies for catering learner diversity in teaching basic chemistry concepts
2. To share experience in adopting various strategies and learning and teaching resources to enhance students' understanding of basic chemistry concepts
3. To introduce relevant resources for learning, teaching and assessment of Chemistry and Combined Science (Chemistry Part) curricula

EXAMINATION REPORT (2012)

General comments and recommendations

- Candidates were generally weak in answering questions involving calculation and data analysis. These include mass/mole/concentration calculations for a titration experiment and calculation of the enthalpy changes of reactions.

- Many candidates were weak in redox chemistry. They were confused about the concepts of oxidation, reduction, oxidation power, reducing power, position of chemical species in the electrochemical series, and chemical reactions that occur at the electrodes.

- Many candidates were not able to state the expected colour changes/observations in chemical tests, or the difference in results of positive and negative tests.

- Many candidates confused the types of chemical bonding with intermolecular forces in different types of chemical species.

DISCUSSION #1

Regarding the basic chemistry concepts (e.g. writing chemical/ionic equations, bonding and structure, balancing half equations, mole calculations, redox),

(i) what are the challenges for your students in understanding the concepts?

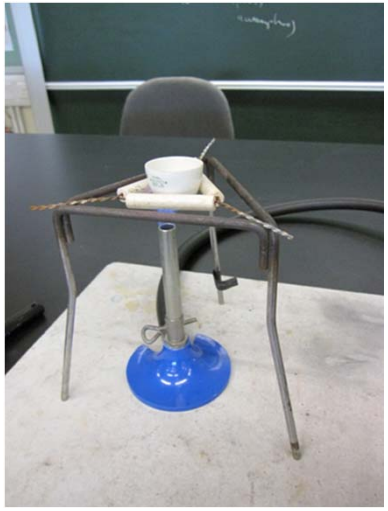
(ii) what have you done to help your students in coping with the challenges?

SHARING OF GOOD PRACTICES IN LEARNING, TEACHING AND ASSESSMENT OF CHEMISTRY

PRACTICAL ACTIVITIES

Taking video/photo of students' practical work for discussion, revision, evaluation, assessment…

Short experiments / demonstrations



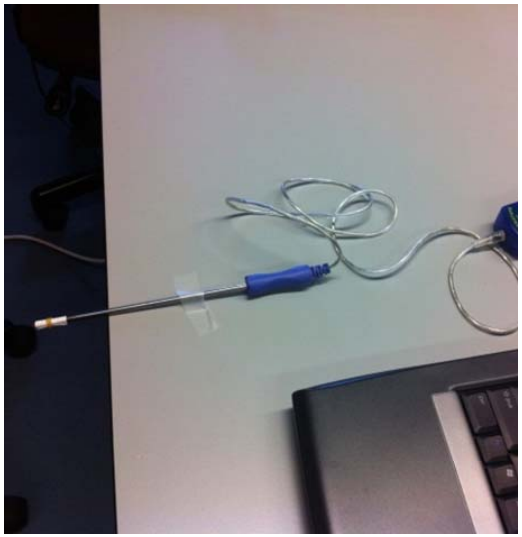
Possible chemical equations

sodium hydrogencarbonate (s) → sodium hydroxide (s) + carbon dioxide (g)

sodium hydrogencarbonate (s) → sodium oxide (s) + carbon dioxide (g) + water (g)

sodium hydrogencarbonate (s) → sodium carbonate (s) + carbon dioxide (g) + water (g)

DEMONSTRATIONS



Classic Chemistry Demonstrations,
the Royal Society of Chemistry
http://www.rsc.org/learn-chemistry/content/filerepository/CMP/00/001/001/Classicdemos_full.pdf

Substance	Temperature decrease (°C)
Ethanol	9.1
Propan-1-ol	6.4
Butan-1-ol	3.3
Pentane	16.2
Hexane	13.9

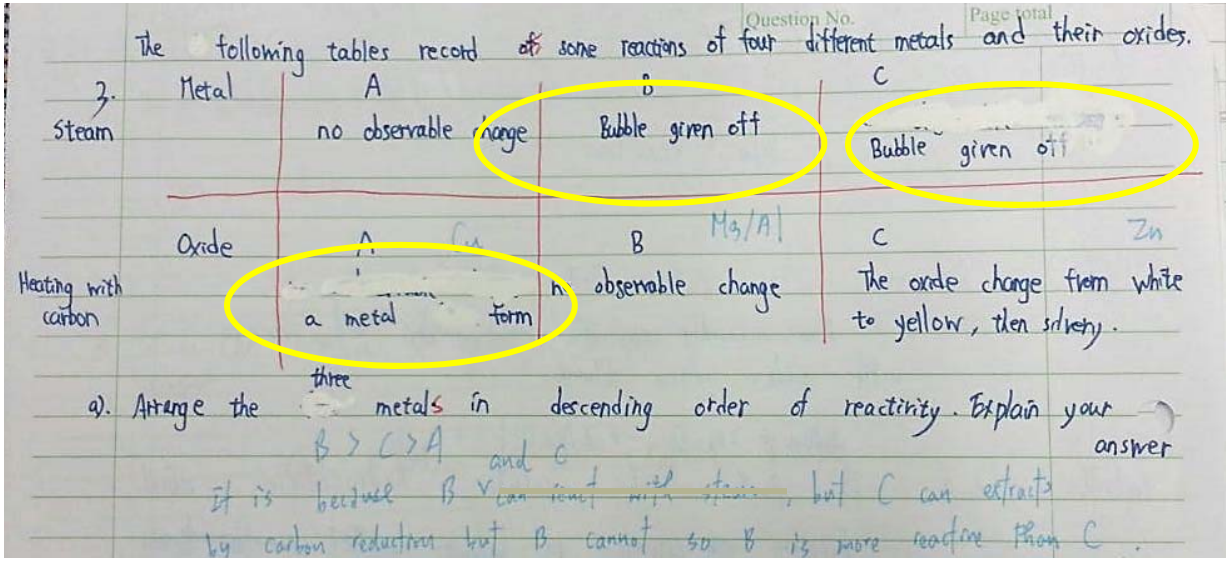
CHEMISTRY DEMONSTRATIONS

- **spectacular, stimulating and motivating**
- **facilitate interpretation of observations and experimental data**
- **facilitate application of knowledge/understanding to solve problems**

DIAGNOSTIC TESTS (12 LEVELS OF ASSESSMENTS)

Level 1	Elements in the Periodic Table	Level 7	General word equations
Level 2	Symbols of transition metals	Level 8	Word equations
Level 3	Chemical formulae of ions	Level 9	Chemical equations
Level 4	Colours of ions	Level 10	Ionic equations
Level 5	Names of compounds	Level 11	Ionic half equations and redox reactions
Level 6	Chemical formulae	Level 12	Redox reactions and ionic equations

DESIGNING QUIZZES



The following tables record of some reactions of four different metals and their oxides.

2. Metal	A	B	C
Steam	no observable change	Bubble given off	Bubble given off

Oxide	A	B	C
Heating with carbon	a metal form	no observable change	The oxide change from white to yellow, then silvery.

a). Arrange the three metals in descending order of reactivity. Explain your answer

B > C > A

It is because B and C can react with steam, but C can extracts by carbon reduction but B cannot so B is more reactive than C.

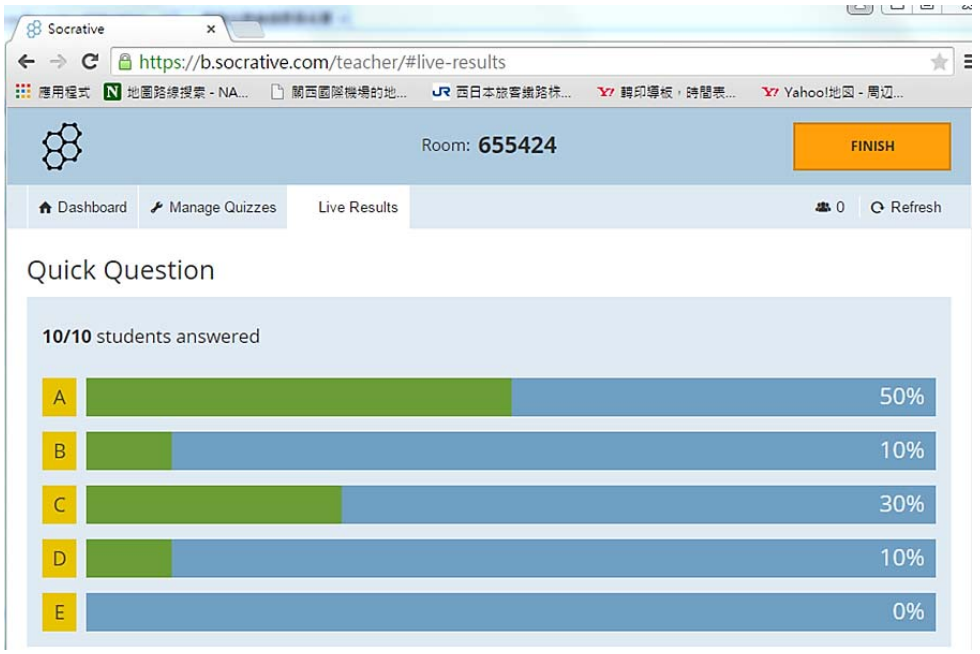
(Courtesy of PLK Ma Kam Ming College)

CLASS/GROUP DISCUSSION

Before lesson

2.	MC Quiz on Unit 40 Le Chatelier's Principle	https://docs.google.com/forms/d/16znzHnRqmDDJS1P6i-t1vAHxW7bGUxSAKUOSIPehS9Y/viewform?usp=send_form	

During lesson



- Group / class discussion
- Clarification of misconception

透過拍攝實驗過程，

提昇同學的學習動機及效能

目標

透過拍攝實驗過程，期望加強同學

- 對實驗步驟的理解
- 講解實驗步驟的能力
- 組內的分工及合作
- 觀察實驗過程的能力

其他好處

- 所拍攝的實驗片段，同學可用作記錄，留念及日後溫習之用。
- 同學更認真及專注地做實驗