



# Resources on Learning and Teaching of Chemistry

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Education Bureau

# Chemistry EdBlog 化學科網誌



## 化學科教師專業發展交流平台

Chemistry Teachers Professional Development and Resource Sharing Platform

CDI Science Section – Chemistry HKEdCity

### 關於我們

此網誌由教育局課程發展處科學教育組及香港教育城共同建立，藉此為化學科教師提供一站式的平台，方便獲得共享的課程資源及相關的課程資訊。

### 新高中化學課程及評估指引




中文版      English Version

### 新高中組合科學課程



11月4日

### 高中化學科課程知識增益系列：日常生活的化學（新辦）

🕒 10:30    👤 by edb-taumankit    🌐 瀏覽：68

搜尋

日期	[場次AA]* 2016/05/20 (星期五) [場次AB]* 2016/06/27 (星期一) (*場次 (AA) 和 (AB) 的內容相同)
時間	[場次AA]* 14:00 - 16:30 [場次AB]* 此乃2.5小時網上課程，內容與場次(AA)完全相同。
場地	[場次AA]* 九龍塘沙福道19號教育局九龍塘教育服務中心西座平台WP01室（九龍塘港鐵站E出口） [場次AB]* 不適用
講者	鄭志遠博士（從事開發OLED技術）及香港理工大學應用生物及化學科技學系姚鍾平博士
活動目標	1. 讓教師進一步理解化學知識與日常生活的聯繫；以及 2. 加深教師了解化學科技的演進如何改變人類的生活。

### 學與教資源

A. 新高中化學科 (84)

1. 必修部分 (10)

- 地球 (13)
- 微觀世界I (25)
- 金屬 (22)
- 酸和鹽基 (19)
- 化石燃料和碳化合物 (20)
- 微觀世界II (10)
- 氧化還原反應、化學電池和電解 (10)
- 化學反應和能量 (8)
- 反應速率 (11)
- 化學平衡 (5)
- 碳化合物的化學 (25)

# I. Learning to Write

- Writing with Chemistry Specific Genres  
化學科專科語體寫作
- <http://resources.edb.gov.hk/~science/genre/index.html>



## 2. Investigative Study in Chemistry

- Investigative Study in Chemistry – Exemplars of Learning and Teaching Activities 化學的探究研習 - 學習活動示例
  - [http://cdl.edb.hkedcity.net/cd/science/chemistry/nss/is/nss\\_is\\_eng.pdf](http://cdl.edb.hkedcity.net/cd/science/chemistry/nss/is/nss_is_eng.pdf)
  - [http://cdl.edb.hkedcity.net/cd/science/chemistry/nss/is/nss\\_is\\_chi.pdf](http://cdl.edb.hkedcity.net/cd/science/chemistry/nss/is/nss_is_chi.pdf)
- 教育電視 - 高中化學探究研習
  - [http://resources.hkedcity.net/resource\\_detail.php?id=207401800](http://resources.hkedcity.net/resource_detail.php?id=207401800)



# 3. Practical Chemistry





# Chemistry EdBlog 化學科網誌

- <http://edblog.hkedcity.net/nsschem>
- Use “SEARCH”
  - Synthesis of benzoic acid from ethyl benzoate
  - Thin layer chromatography of painkillers
  - Isolation of chlorophyll from spinach
  - Decomposition of baking soda  $\text{NaHCO}_3(\text{s})$

# Chemistry Experimental Techniques 化學實驗技巧

教師 中學生 小學生 家長 企業

輸入關鍵字

Chemistry Experimental Techniques (化學實驗技巧)

教域主頁 > Chemistry Experimental Techniques (化學實驗技巧)



- 容量分析
- 定性分析
- 儀器的使用
- 分離和提純的方法
- 其他

### 簡介

化學是一門以實驗為本的科學學科。在化學及組合科學(化學部分)課程中，學生透過不同的學與教活動認識各項實驗技巧和化學分析。除了運用實驗課上即場示範和動手進行實驗，多媒體亦是一種能有效幫助學生認識各種實驗技巧和方法的教學工具。

這網頁內的短片示範了某些實驗方法的程序，並簡單地說明其理論。學生可在進行實驗、校本評核的實驗測驗和探究研習之前，運用這些短片認識相關的實驗技巧，而教師亦可利用這些短片進行教學和實驗前的講解。





# Chemistry Experimental Techniques 化學實驗技巧

- <http://minisite.proj.hkedcity.net/chemtech/cht/index.html>
  1. Volumetric Analysis
  2. Qualitative Analysis
  3. Use of Instrument
  4. Separation and purification techniques
  5. Others





























# Microscale Chemistry Experiments 微型化學實驗

- <http://www.hkbu.edu.hk/~micschem/material.html>
  - Chemical Cells
  - Generation of  $\text{NO}_2$ : A Case of Air Pollution
  - Analysis of iron in commercial iron tablet
  - ...

# Microscale Experiment – Solubility of Group II Compounds

	$\text{IO}_3^-$	$\text{SO}_4^{2-}$	$\text{C}_2\text{O}_4^{2-}$	$\text{CO}_3^{2-}$	$\text{H}_2\text{O}$	
$\text{MgCl}_2$						
$\text{CaCl}_2$						
$\text{SrCl}_2$						
$\text{BaCl}_2$						

Note: All are aqueous solutions,  $0.1 \text{ mol dm}^{-3}$ ,  $1 \text{ cm}^3$  each

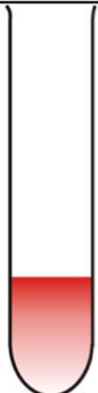





# Reference:

- Flinn Scientific  
Youtube Channel
- <https://www.youtube.com/user/FlinnScientific>

# Assessment for Learning (AfL)

With reference to the first experiment set-up shown below, deduce which results in A, B and C is/are reasonable? Explain your choice(s) briefly.

Set-up	Experiment	A	B	C
Chemicals added	 <ul style="list-style-type: none"> <li>• 5 mL 2 M <u>NaOH(aq)</u></li> <li>• 0.05 mL 0.1% phenolphthalein solution</li> </ul>	 <ul style="list-style-type: none"> <li>• 3 mL 2 M <u>NaOH(aq)</u></li> <li>• 2 mL 2 M <u>NaCl(aq)</u></li> <li>• 0.05 mL 0.1% phenolphthalein solution</li> </ul>	 <ul style="list-style-type: none"> <li>• 5 mL 2 M <u>NaOH(aq)</u></li> <li>• 0.05 mL 0.1% phenolphthalein solution</li> </ul>	 <ul style="list-style-type: none"> <li>• 5 mL 2 M <u>NaOH(aq)</u></li> <li>• 0.05 mL 0.1% phenolphthalein solution</li> </ul>
Temperature / °C	0	0	25	50
Time for the pink colour disappear /s	220	198	218	25

# Nuffield Foundation - Practical Chemistry

Enhancing learning and teaching

Resources ▾ Wiki Communities ▾ CPD Primary ▾ Higher Education ▾ About Websites ▾

Home > Resources > Nuffield

## Nuffield Foundation - Practical Chemistry

This collection of over 200 practical activities demonstrates a wide range of chemical concepts and processes. Each activity contains comprehensive information for teachers and technicians, including full technical notes and step-by-step procedure. Developed by the Nuffield Foundation and the Royal Society of Chemistry, the Practical Chemistry activities accompany [Practical Physics](#) and [Practical Biology](#).

Refine these results

211 chemistry resources

New search

Sort by: Relevance ▾

Previous 1 2 3 4 ... 6 Next

► Resource Type

► Age Group

► Audience

► Subject

Information & data


Snippets & articles

Educational resources & tests

Lesson plans & topics

Training & curricula

**Reaction between aluminium and iodine**




**Teacher** 11 to 18 years

**Subjects:** Practical...

[1 Experiment](#)

**Red, white and blue!**




**Teacher** 11 to 18 years

**Subjects:** Practical chemistry, Exposition, Experiment...

[1 Experiment](#)

**Handling liquid bromine and preparing bromine**




**Teacher** 11 to 18 years

**Subjects:** Practical chemistry, Standard laboratory...

[1 Experiment](#)

**The alcohol gun**




**Teacher** 11 to 18 years

**Subjects:** Practical chemistry, Standard laboratory...

[1 Experiment](#)

**The fractional distillation of crude oil**




**Teacher** 11 to 18 years

**Subjects:** Practical chemistry, Standard laboratory...

[1 Experiment](#)

**Involvement of catalysts in reactions**



**Teacher** 11 to 18 years


**Subjects:** Practical chemistry, Standard laboratory...

[1 Experiment](#)

Newsletter

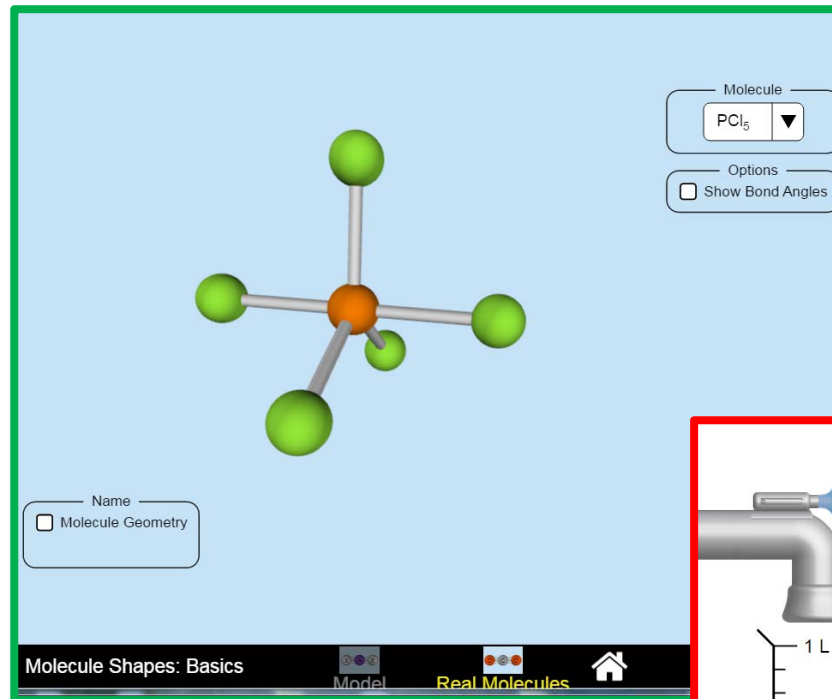
Feedback



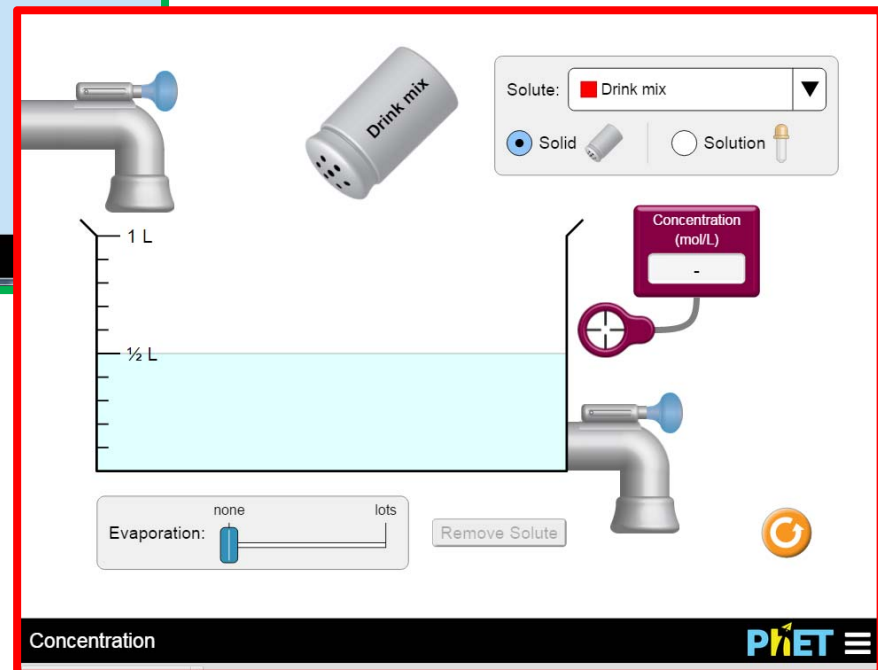


# **4. PhET Simulations**

# eLearning, e.g. PhET Simulations



(Can be used offline  
on mobile devices)

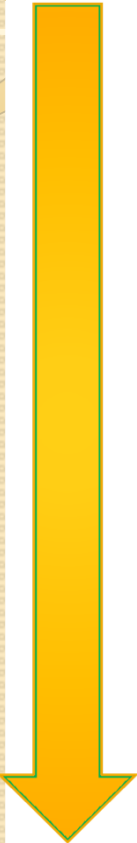


The screenshot shows the 'Concentration' simulation. It features a large graduated cylinder with a light blue liquid level at the 1/2 L mark. Above the cylinder is a faucet on the left and a 'Drink mix' container on the right. A control panel on the right includes a 'Solute' dropdown set to 'Drink mix', radio buttons for 'Solid' (selected) and 'Solution', and a 'Concentration (mol/L)' display showing a dash. At the bottom, there is an 'Evaporation' slider set to 'none' (between 'none' and 'lots'), a 'Remove Solute' button, and a circular refresh icon. The bottom navigation bar shows 'Concentration' and the PhET logo.



# **5. eLearning & eAssessment**

# eL and eA

- 
- Online Voting Systems
    - Socrative
    - Ping Pong / Kahoot / Plickers / ...
  - Google Forms / Doc
    - Integrating online learning and assessment?
  - Learning Management Systems
    - Schoology
    - Edmodo
  - Nearpod, ...



# eL & eA

- To promote the use of e-learning (eL) and / or e-assessment (eA) in SS Chemistry / SS Combined Science (Chemistry part) curricula, a learning community, with the support from Science Education Section of EDB, will be formed, from September 2015 to August 2016.
- Please join the learning community.
  - <http://goo.gl/forms/c468uNASx9>






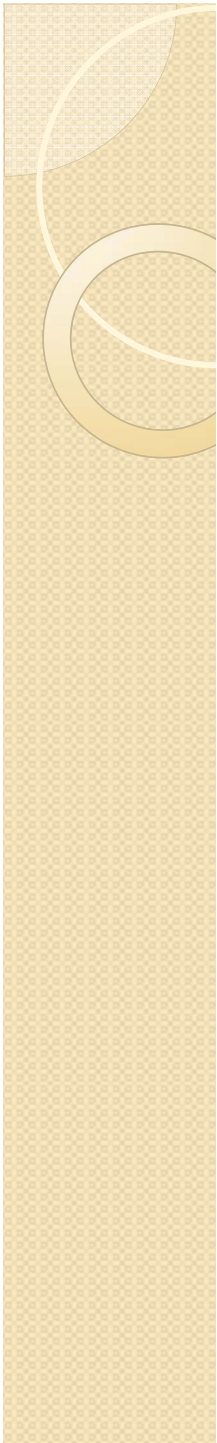
<http://goo.gl/forms/c468uNASx9>



**Thank You!**



# Example of demonstration



## Demonstration: Acid-based Neutralization of Magnesium Carbonate Light [MCL, $3\text{MgCO}_3 \cdot \text{Mg}(\text{OH})_2 \cdot 3\text{H}_2\text{O}$ ] against dilute $\text{HCl}(\text{aq})$ (1 M)

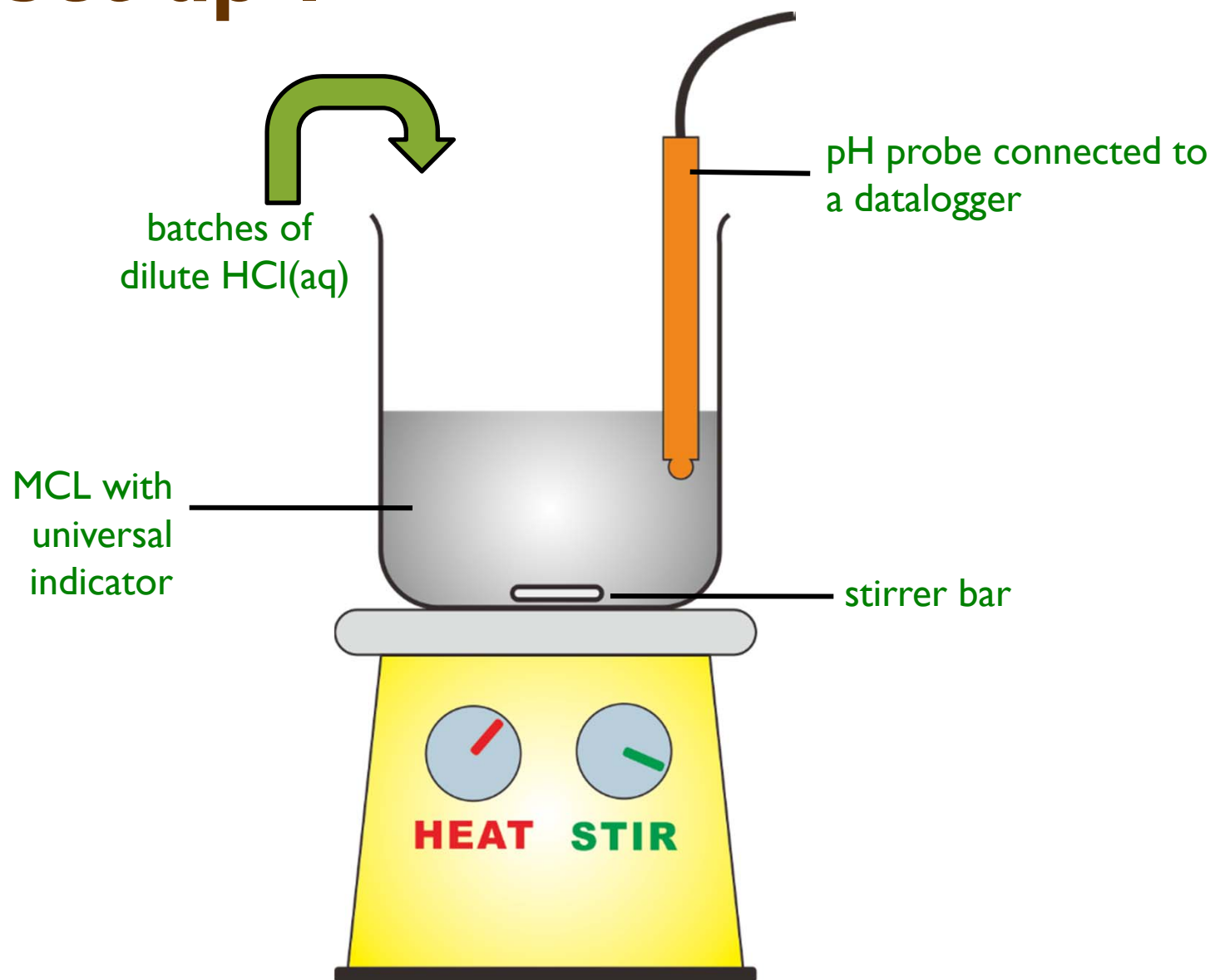
1. Add 5 g MCL to 500 mL deionized water in a 1000 mL beaker
2. Add 5 mL universal indicator solution, a stirrer bar and then a pH probe (interfaced to a datalogger unit)
3. Put the beaker with the mixture on a magnetic stirrer unit, and start stirring
4. Add a sample of 10 mL 1 M  $\text{HCl}(\text{aq})$  to the stirred mixture
5. Observe careful the pH and colour changes
6. Repeat step 4 and 5 for several times, i.e. up to about a total of 70 or 80 mL  $\text{HCl}(\text{aq})$

# Chemicals and Apparatus

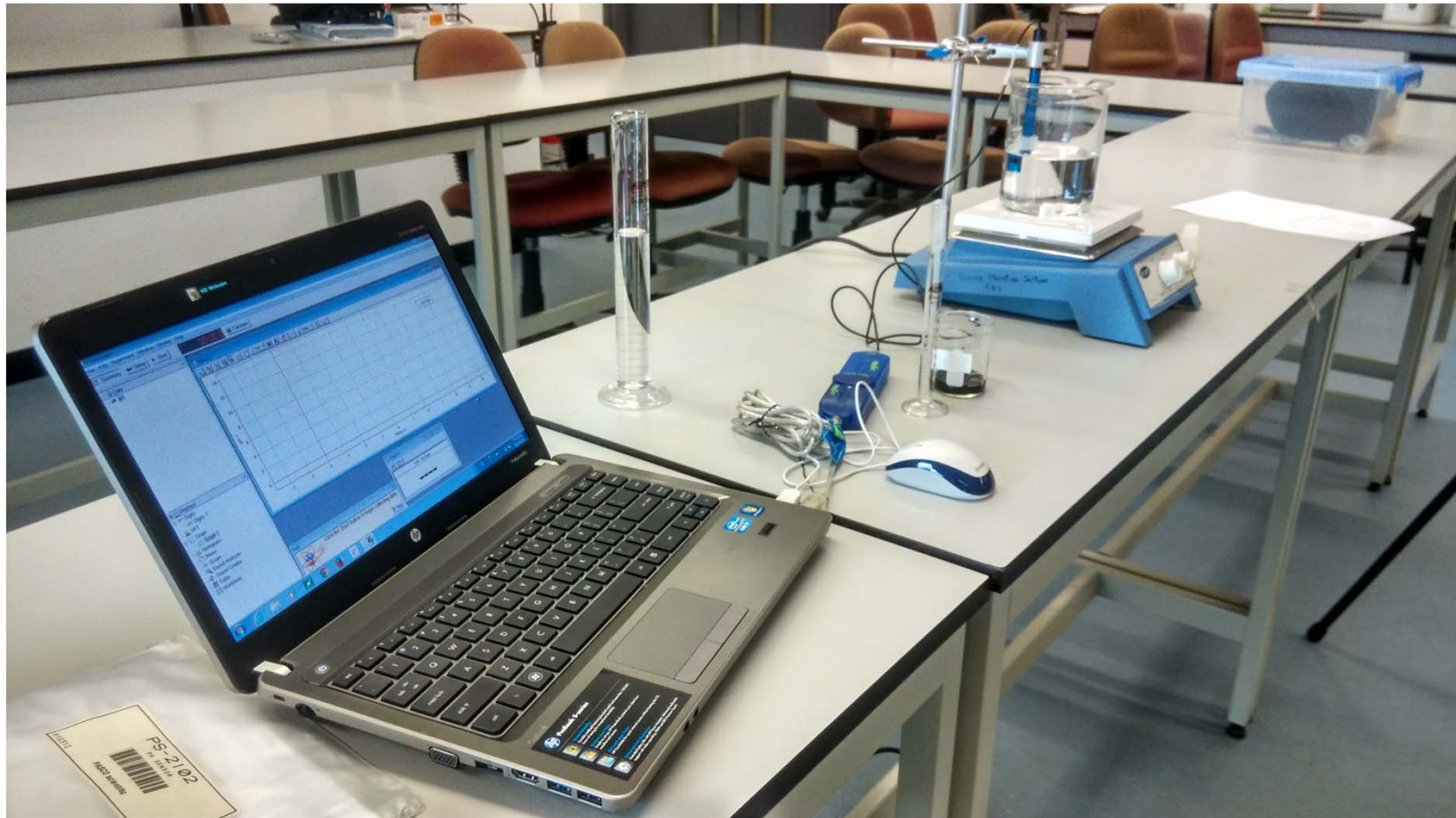
- Magnetic stirrer unit X 1
- Stirrer bar X 1
- Stand and clamp X 1
- 1,000 mL beaker X 1
- universal indicator 5 mL each X 2
- 10 mL measuring cylinder X 1
- hydrochloric acid, 1 M about 70 mL each X 2
- 100 mL beaker X 1
- 10 mL measuring cylinder X 1
- 100 mL measuring cylinder X 1
- plastic dropper X 1
- deionised water 500 mL each X 2
- $3\text{MgCO}_3 \cdot \text{Mg}(\text{OH})_2 \cdot 3\text{H}_2\text{O}$  5 gram each
- USB link
- pH probe (Sensor)
- Notebook computer with Datastudio



# Set-up I



# Set-up 2



# Pedagogy

- Predict (P) – Observe (O) – Explain (E)
  - (P)
    - Predict the initial pH of the MCL (suspension)
    - Predict how the colour of the mixture change upon the addition of the first batch of dilute HCl(aq)
    - Predict how the pH of the mixture change upon the addition of the first batch of dilute HCl(aq)
    - ... second batch ... third batch ... etc.
  - (O)
    - Record the colour of the mixture throughout the demonstration
    - Read the graph showing variation of pH of the mixture upon the addition of dilute HCl(aq) throughout the demonstration
    - ...
  - (E)
    - Describe the relation of pH values and the colour of the mixture
    - Explain the variation of the colour of the mixture upon the addition of dilute HCl(aq)
    - Explain whether MCL can be used as an antacid
    - ...

**Exercise and / or Assessment**

# Sample Results (11/3/2015)

