Chemistry Practical Recording Skills

1. **Most marks are given for the observations**.
   Record what meets your eyes, as closely as possible.
   Sometimes your prediction of a certain compound may be wrong at the start.
   DO NOT let your 'intuition' lead you to write observations that you do not see.
   You may follow your intuition, but do not write what you are sure you cannot see or hear.

2. Use the phrase *"**Effervescence occurs**"* instead of "a colourless gas is evolved" as you cannot see a colourless gas.
   Remember to write in the test for the gas when you write "*Effervescence occurs*"
   eg. *"Effervescence occur. The **gas produced a white ppt in limewater**, showing that carbon dioxide gas is produced."*

3. Always be **ready to do a test** on the gas **whenever you add Dilute Acids** to your test sample.
   (a) If test sample is a ***solid***, start with testing of hydrogen, carbon dioxide, oxygen.
   (b) If the test sample is a ***liquid***, start with testing of oxygen, carbon dioxide.

4. When you **heat a solid**, remember to **observe for water vapour**!
   Test the liquid or vapour using **cobalt (II) chloride paper**. It will turn from **blue to pink**.

5. DO NOT test for water vapour if you are heating a solution, it's probably the steam produced from the boiling of the solution.

6. Gases from reagents are NOT valid observation.
   Eg. **If you add aqueous ammonia** to a solution and heat it, the **ammonia gas is always produced** is from the reagent- **aqueous ammonia**. So do not test for ammonia gas if you add aqueous ammonia.

7. DO NOT use the reagents or test sample in **large** amount, unless you are told to do so, esp. the test of cations which needs to be followed by "adding sodium/ammonium hydroxide to excess". Be very careful if the precipitate dissolves in excess.
   Pour away some precipitate if you have accidentally produced too much before trying to add excess reagents like sodium hydroxide solution or aqueous ammonia.

8. **Record each and every colour change you can see**.
   Add reagents in small drops, observe & record before adding more.
   Note all changes in between a few drops and in excess.
   Beware of mistaking excess unreacted solid samples as precipitate produced during reaction. A precipitate is an insoluble product (solid) produced when solutions react.

9. If a mixture of colours are observed in layers, record accordingly.
   BUT you must shake the mixture to make sure it mix well.
   Put on a rubber stopper and shake it.

10. **DO NOT INVENT observations**. When there is no observations, write "***No change is observed***". If you think that there should be an observation, **try repeating the procedures** after reading the question paper carefully to make sure you don't miss out anything.

11. Read the questions in the CONCLUSION section carefully.
    If the question ask for NAME, give the NAME.
    If the question ask for FORMULA, give the FORMULA.
    If the question ask for name of salt, give the name of ionic compound : "cation + anion".
    eg. copper (II) sulfate, zinc nitrate, ammonium chloride, iron (II) sulfate
    If the question ask for ELEMENT, give ELEMENT. {No charge!!}

12. If you are asked to **heat a solid**, use a **dry test tube**.
    The amount used will depend on the instructions, eg. 1/3 of sample or 1 spatula.

13. If instruction says "use **boiling tube**", do accordingly.

Some standard observations:

1. No change is observed.
2. A white precipitate is formed.
3. A white precipitate is formed.

   The precipitate **dissolves** in **excess sodium hydroxide**/ammonium hydroxide to give a **colourless solution**. ***(Note : Do not write 'clear' solution)***
4. A blue precipitate is formed.

   The precipitate is **insoluble** in **excess sodium hydroxide solution**.
5. A **blue precipitate** is formed.

   It **dissolves in excess aqueous ammonia** to form a **dark blue solution**.
6. Effervescence occurred.

   The gas produced a white ppt in limewater, showing that carbon dioxide gas is produced.
7. The **green solid dissolves** to **form** a **green solution**.
8. Effervescence occurred. **Reddish-brown fumes** produced.
9. Bubbles of colourless gas are produced which extinguished a 'burning' splint with a 'pop' sound.
10. The solid dissolves in cold water to give a colourless solution.

Last but not least, READ THE INSTRUCTIONS.

Try not to highlight the entire question papers until it looks very messy.

Write neatly.

Do not give yourself too much stress. Most pupils will get between 8 to 11 marks out of 15 if they follow instructions and observe carefully. Usually, one of the question (Phy or Chem) will be easier than the other. Do the one that you are more confident to calm yourself down so that you will do equally well for the other question.

If you think that certain equipment is faulty, you may ask the invigilator for help. Marks will NOT be penalised unless you specifically asked for help to perform the experiment or setup experiment… which is very unlikely.

I would expect the experiments to be quite standard, and mainly testing your skills to perform according to clear instructions in the papers.

Colour & Texture of Solids

Colour	Possible identities
Black powder	Carbon, iron(II) oxide, copper(II) oxide, manganese (IV) oxide
Black solid	Iodine crystals
Grey powder or granules	Metals like magnesium, aluminium, zinc, lead *(with a layer of grey oxides hiding it's metallic shine)*
Silvery strip, granules	Metals like magnesium, aluminium, zinc, lead (without oxide layer)
Shiny grey powder	Aluminium metal
Reddish-brown, pinkish strips or powder	Copper metal
Dark reddish-brown powder	Iron(III) oxide
Dark brown powder	Lead(IV) oxide, iron (III) carbonate
Green powder	Copper(II) carbonate, iron(II) carbonate
Pale green solid	Iron(II) salt eg. Iron(II) sulfate, iron(II) chloride, iron(II) nitrate
Yellowish-brown solid	Iron(III) salt eg. Iron(III) sulfate, iron(II) chloride, iron(III) nitrate, iron(III) hydroxide
Purple solid	Potassium manganate(VII)
Orange solid	Potassium dichromate(VI)
Yellow solid	Potassium chromate(VI) K_2CrO_4
White solid/powder	Salts of ammonium, Group I, II and III, zinc and lead(II).

Colour of solution

Colourless cations: NH_4^+, K^+, Na^+, Ca^{2+}, Mg^{2+}, Al^{3+}, Zn^{2+}, Pb^{2+}

Colourless aqueous solution : dilute acids, aqueous alkalis, aqueous H_2O_2

Coloured cations: Cu^{2+} (blue – sulfate, nitrate | light green – chloride)
Fe^{2+} (pale green)
Fe^{3+} (yellowish-brown)

Coloured anions: CrO_4^{2-} (yellow)
$Cr_2O_7^{2-}$ (orange)
MnO_4^- (purple)

Acid + Copper compounds

Copper(II) carbonate + dil. HCl
Effervescence occur. The gas produced a white ppt in limewater, showing that carbon dioxide gas is produced. The green solid dissolves to form a **green** solution. copper (II) chloride.
**** copper (II) chloride turns green when it is saturated with chloride ions, eg. adding of sodium chloride to a copper (II) chloride solution. If you dilute it with water, it will turn blue again. Basically, all copper (II) ions solutions appear blue.***

Copper(II) carbonate + dil. H_2SO_4
Effervescence occur. The gas produced a white ppt in limewater, showing that carbon dioxide gas is produced. The green solid dissolves to form a **blue** solution. copper (II) sulfate

Copper(II) carbonate + dil. HNO_3
Effervescence occur. The gas produced a white ppt in limewater, showing that carbon dioxide gas is produced. The green solid dissolves to form a **blue** solution. copper (II) nitrate

Copper(II) oxide + dil. HCl
The black solid dissolves to give a clear blue solution. copper (II) chloride.
When added with sodium chloride, it turns green.

Copper(II) oxide + dil. H_2SO_4
The black solid dissolves to give a clear blue solution. copper (II) sulfate

Copper(II) oxide + dil. HNO_3
The black solid dissolves to give a clear blue solution. copper (II) nitrate