

NAME: _____

DAPTO HIGH SCHOOL

PRELIMINARY CHEMISTRY ASSESSMENT TASK

Outcomes to be assessed:

8.4. 4 – The concentration of salts in water will vary according to their solubility and precipitation can occur when the ions of an insoluble salt and in solution together.

- P8 – Describes factors that influence the type and rate of chemical reactions.
- P11 – Identifies and implements improvements to investigation plans.
- P12 – Discusses the validity and reliability of data gathered from first-hand investigations and secondary sources.
- P13 – Identifies appropriate terminology and reporting styles to communication information and understanding.
- P14 – Draws valid conclusions from gathered data and information.

BACKGROUND INFORMATION: When two clear solutions containing ionic salts are mixed together, an insoluble product may form and settle out of the mixture. Knowing which ions will form precipitates is essential in many industrial processes and in maintaining waterways.

AIM: To compare the solubility of ionic substances through precipitation reactions.

EQUIPMENT:

barium chloride	1 x safety goggles
copper(II) sulfate	1 x test tube rack
lead(II) nitrate	8 x test tubes
magnesium sulfate	
potassium iodide	
potassium chromate	
sodium carbonate	
sodium hydroxide	
iron (II) nitrate	

PROCEDURE:

1. Below is a list of solutions you will mix:

Group 1:

barium chloride + magnesium sulfate
magnesium sulfate + sodium hydroxide
sodium hydroxide + copper(II) sulfate
sodium carbonate + barium chloride

Group 2:

lead(II) nitrate + potassium iodide
lead(II) nitrate + sodium carbonate
iron(II) nitrate + sodium hydroxide
potassium chromate + iron(II) nitrate

2. Place a small amount of the first solution listed in a test tube.
3. Add a few drops of the second solution.
4. Record your observations regarding colour and texture of each precipitate in the table below. (Note: The texture of a precipitate can be described as **fine**, **coarse** or **gelatinous**).
5. Use the Solubility Table provided to identify which of the products is a precipitate.

PART A: RESULTS (12 marks)

Reactants	Products	Observation	Precipitate

Solubility table ► *'i' signifies insoluble, 's' signifies soluble.*

	Cl ⁻	CO ₃ ²⁻	CrO ₄ ²⁻	I ⁻	NO ₃ ⁻	OH ⁻	SO ₄ ²⁻
Ba ²⁺	s	i	i	s	s	i	i
Ca ²⁺	s	i	s	s	s	i	i
Cu ²⁺	s	i	i	s	s	i	s
Fe ²⁺	s	i	i	s	s	i	s
K ⁺	s	s	s	s	s	s	s
Mg ²⁺	s	i	s	s	s	i	s
Na ⁺	s	s	s	s	s	s	s
Pb ²⁺	s	i	i	i	s	i	i

3. What are spectator ions and give ONE example from the equations above.

4. Write equations for the reactions in this experiment EXCLUDING spectator ions.

4. What are these type of equations called? _____

Marking Rubric

PART A: RESULTS

Outcomes	2 marks	4 marks	6 marks	8 marks	Mark
P4, P8	Correctly identifies some of the reactants and products	Correctly identifies all of the reactants and products	Correctly identifies some of the reactants and products and the corresponding precipitates	Correctly identifies all the reactants and products and the corresponding particles	

	1 mark	2 marks	3 marks	4 marks	Mark
P12	Carries out the planned procedure	Carries out the planned procedure and records basic observations for some of the reactions	Carries out the planned procedure and records basic observations for all of the reactions	Carries out the planned procedure and records observations for all of the reactions, using appropriate terminology	

PART B: SAFETY

Outcomes	1 mark	2 marks	3 marks	4 marks	Mark
P11	Identifies a potential hazard associated with the experimental procedure	Identifies two potential hazards associated with the experimental procedure	Identifies two or more potential hazards associated with the experimental procedure and some basic methods for addressing those hazards	Identifies two or more potential hazards associated with the experimental procedure and appropriate methods for addressing those hazards	

PART C: CHEMICAL EQUATIONS

Outcomes	6 marks	12 marks	18 marks	24 marks	Mark
P13	Constructs appropriate chemical equations for some of the reactions	Constructs appropriate chemical equations for all of the reactions	Constructs appropriate chemical equations for all of the reactions, formulae contain some errors	Constructs appropriate chemical equations for all of the reactions, using accurate formulae and states	

PART D: APPLICATION

Outcomes	1 marks	2 marks	3 marks	4 marks	Mark
P14	Outlines a basic strategy to identify the unknown substance	Outlines a basic strategy to identify the unknown substance, the reagents identified are inappropriate	Outlines a strategy to identify the unknown substance and correctly identifies some of the reagents to use used	Outlines a logical strategy to identify the unknown substance and accurately identifies reagents to be used	