



## YEAR 12 Chemistry 2018

### Chemical Monitoring and Management

<b>Due Date:</b> Thursday 31st May 2018, Week 5 Prac will be done in class on this day, preparation needs to have been done prior (Methods, risk assessment etc).	<b>Assessment Name:</b> Open Ended Investigation – Ion Identification
<b>Mark:</b> /30	<b>Weighting:</b> 30 %

#### SYLLABUS OUTCOMES TO BE ASSESSED:

- H2. **Analyses** the ways in which models, theories and laws in chemistry have been tested and validated
- H4 **assesses** the impacts of applications of chemistry on society and the environment
- H10. **analyses** stoichiometric relationships
- H12. **Evaluates** ways in which accuracy and reliability could be improved in investigations
- H13. Uses terminology and reporting styles appropriately and successfully to **communicate** information and understanding

#### DIRECTIVES TO BE ASSESSED:

**Identify:** Recognise and name

**Explain:** Relate cause and effect; make the relationships between things evident; provide why and/or how.

**Justify:** Support an argument or conclusion

**Evaluate:** Make a judgement based on criteria; determine the value of

**Describe:** Provide characteristics and features

**Assess:** make a judgement of value, quality, outcomes, results or size

**Analyse:** Identify components and the relationship between them; draw out and relate implications.

#### TASK DESCRIPTION:

Plan and conduct an investigation to qualitatively identify 2 unknown ionic substances using chemical and spectroscopic tests. You will record and analyse the results and will be required to justify for identification to demonstrate your understanding. Correct writing of ions with need to be shown. To ensure safety you will also need to include a risk assessment associated with the tests.

#### ASSESSMENT CRITERIA – STUDENT CHECKLIST:

You will be assessed on your ability to:

- ◆ Plan, prepare and carry out practical task to chemically tests to identify unknown ions
- ◆ Record all necessary data and analyse test results
- ◆ Justify your identification of the anions and cations present in the solutions
- ◆ Include a risk assessment

## MARKING GUIDELINES

Guideline	Mark/Grade
<b>H2. Analyses the ways in which models, theories and laws in chemistry have been tested and validated</b>	<b>Possible Mark</b>
<b>Description</b>	
Gives valid reasons to support the identification made of all ions	<b>4</b>
Gives valid reasons to support the identification, mode of most ions OR limited reasons for the identification made of all ions	<b>3</b>
Gives reasons to support the identification made of some ions	<b>2</b>
Gives limited reasons to support the identification made of some ions	<b>0-1</b>
<b>H14. Assessment of the validity of conclusions</b>	<b>Possible Mark</b>
Gives detailed assessment of validity of identification	<b>4</b>
Gives assessment of validity of identification	<b>3</b>
Gives some form of assessment or discussion of the method and results of the identification	<b>2</b>
Gives limited or no assessment of the validity of the identification	<b>0-1</b>
<b>H4. Assess the impact of the applications of chemistry on society and the environment</b>	<b>Possible Mark</b>
Writes a clear and concise risk assessment including activity, possible risk, strategy to minimise risk and environmental impacts of ions identified (if any)	<b>2</b>
Writes a risk assessment that addresses some aspects, including activity, possible risk, strategy to minimise risk and environmental impacts of ions identified (if any)	<b>1</b>
Writes an inadequate risk assessment or no risk assessment	<b>0-1</b>
<b>H10. analyses stoichiometric relationships</b>	<b>Possible Mark</b>
<b>Description</b>	
<b>Identities of Cations and Anions</b>	
Correctly identifies all ions	<b>4</b>
Correctly identifies most ions	<b>2-3</b>
Correctly identifies some or no ions	<b>0-1</b>
<b>H12: Evaluates ways in which accuracy and reliability could be improved in investigations using the gathered data and expected results</b>	<b>Possible Mark</b>
<b>Description</b>	
Using practical and expected results, identifies and evaluates ways in which accuracy and reliability could be improved in the ion identification	<b>4 - 5</b>
Using practical and expected results, identifies and describes ways in which accuracy and reliability could be improved in ion identification	<b>2 - 3</b>
Acknowledges that accuracy and reliability could be improved in ion identification	<b>0 - 1</b>
<b>H13: Uses terminology and reporting styles appropriately and successfully to communicate information and understanding</b>	<b>Possible Mark</b>
<b>Description</b>	
<b>Precipitation Tests - Cations</b>	<b>Possible Mark</b>
Records all observations accurately	<b>5-6</b>
Records most observations	<b>3-4</b>
Records some or no observations	<b>0-2</b>

<b>Flame Tests - Cations</b>	<b>Possible Mark</b>
Correctly describes flame colour	<b>2</b>
Incorrectly describes flame colour	<b>1</b>
Records no observations	<b>0</b>
<b>Precipitation Tests - Anions</b>	<b>Possible Mark</b>
Records all observations accurately	<b>6-8</b>
Records most observations	<b>3-5</b>
Records some or no observations	<b>0.2</b>

**PICTON HIGH SCHOOL**  
**STAGE 6 HSC Chemistry**  
**Chemical Monitoring and Management**  
 Identification of Ions

Name: \_\_\_\_\_

Bottle Labels  
 \_\_\_\_\_

**Task:** Determine the identity of two (2) unknown ionic solutions. These solutions have been labelled A and B. Each solution is pure and contains one anion and one cation. Cations the solutions might contain include:  $K^+$ ,  $Na^+$ ,  $Ba^{2+}$ ,  $Sr^{2+}$ ,  $Pb^{2+}$ ,  $Fe^{2+}$ ,  $Fe^{3+}$  and  $Cu^{2+}$ . Anions the solutions might contain include:  $Cl^-$ ,  $PO_4^{3-}$ ,  $CO_3^{2-}$  and  $SO_4^{2-}$ . Solutions A and B contain different cations and anions.

**Equipment:**

- Unknown solutions labelled A and B
- Labelled solutions containing  $H^+$ ,  $Ag^+$ ,  $Ba^{2+}$ ,  $Cu^{2+}$ ,  $Cl^-$ ,  $CO_3^{2-}$ ,  $SCN^-$  and  $SO_4^{2-}$ .
- Test tubes
- Nichrome wire in a glass rod/ or spray bottle
- 2M HCl solution in a beaker (for washing the Nichrome wire loop)
- A small beaker (to hold unknown solutions in flame tests)

**CATION IDENTIFICATION**

Precipitation Tests – Record your observations in the table.

Unknown	$Cl^-$	$CO_3^{2-}$	$SO_4^{2-}$	$SCN^-$
A				
B				

Flame Tests – Record your observations in the table

Unknown	Observations from Flame Test
A	

B	
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### ANION IDENTIFICATION

Precipitation Tests – Record your observations in the table

Unknown	H <sup>+</sup>	Ag <sup>+</sup>	Ba <sup>2+</sup>	Cu <sup>2+</sup>
A				
B				

### IDENTITIES OF THE UNKNOWN SOLUTIONS

Unknown	Ions	Justification of conclusions
A	Cation	
	Anion	
B	Cation	
	Anion	

**Assessment of validity of conclusions:**

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**Risk Assessment:**

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