Notice of Assessment Task
Year 11 Chemistry
Depth Study

Date of initial notification:	**Date of submission of task:**
Monday 12 May 2025 Week 3, Term 2	Wednesday 4 June 2025 Week 6, Term 2

Teacher:	**Task Number:**
Mrs Francis	2

Time Allowed:	**Weighting of task:**
3 Weeks	40%

Course Component/Focus area/topic/module:
Module 2 and Module 3

Task Description – First-Hand Investigation & Scientific Report

This Depth Study requires you to complete the following:

- select **one displacement reaction** from the list below
- conduct a **first-hand investigation** in class
- submit a **scientific report**
- submit **CRAAP** sheets for all your secondary sources

Scenario

You are a Chemist hired by the International Maritime Organisation (IMO). The IMO wants you to provide advice on how they can protect and reduce the corrosion of metal marine equipment. They want to know if the following reactions will induce a displacement reaction, which would produce a protective coating to reduce the corrosion of the metal. In the process, you will also **calculate** the **molar mass** of the **displaced metal**. Choose ONE reaction below for your investigation.

- Zinc and copper (II) sulfate
- Iron and copper (II) nitrate
- Aluminium and copper (II) chloride
- Zinc and iron (II) sulfate
- Copper and silver nitrate

Scientific Report Structure

Your scientific report will include:

- Title cover page
- Background research
  - Define and describe the purpose of moles, molar mass and stoichiometry with examples
  - Outline issues with metals e.g. in maritime environments
  - Describe displacement reactions
  - Describe the metal reactivity series and provide diagram
  - Develop a question (aim), which will be the basis if your investigation
- Aim
- Hypothesis
- Apparatus
- Risk Assessment
- Method
- Results
  - Tabulated quantitative and qualitative data
  - Calculations
- Discussion

- Explain the chemistry behind the results
- Detail improvements in reliability, validity and accuracy
- Discuss application of displacement reactions e.g. in metal preservation
- Based on this investigation and the information you gained from your research on metal reactivity, suggest possible future research

- Conclusion

Your scientific report must comply with the following format:

- Calibri font
- 12 size font
- 1.5 line spacing
- New page for each heading

You will analyse and evaluate the secondary sources utilised in your research to determine their reliability and validity. You will use the provided CRAAP worksheet to help you.

You will submit your report as a digital copy that must be uploaded to the Google Classroom by the submission date.

Outcomes/Competencies to be assessed in this task:	
CH11-1	develops and evaluates questions and hypotheses for scientific investigation
CH11-2	designs and evaluates investigations in order to obtain primary and secondary data and information
CH11-3	conducts investigations to collect valid and reliable primary and secondary data and information
CH11-7	communicates scientific understanding using suitable language and terminology for a specific audience or purpose
CH11-9	describes, applies and quantitatively analyses the mole concept and stoichiometric relationships

Feedback: How will I receive feedback on this task?

☐ Written

☐ Verbal

- *If you are absent on the day that the task is due, you MUST see your teacher the next day (not your next lesson) that you are present at school to show your medical certificate or produce a misadventure form (refer to your Assessment Booklet for a copy of the form).*
- *Exemptions and extensions for any other reason will only be determined at the discretion of the Head Teacher, and only in extenuating circumstances. You must advise the Head Teacher as soon as possible if you know you are unable to submit the task on the due date.*
- *All appeals must be lodged within 48hrs of receipt of the task. Students who may consider an appeal are not permitted to take their task home. The original task cannot be altered in any way prior to the appeal process.* See Assessment booklet for details.

Students must complete 15 mandatory hours. Students must complete **15 mandatory hours** as part of the Depth Study (5 have already been allocated to another task). The **10 hours** are outlined below.

Hour	Description
1-2	Displacement lessons.
3-4	Preparation to conduct investigation. Students provide teacher with chosen reaction and apparatus list.
5	Individually write up background research.
6-7	Conduct displacement reaction. Write up: aim, hypothesis, apparatus, method. Collect data.
8	Individually do calculations/make predictions of the displacement reaction. Individually write up results.
9	Individually write up discussion
10	Individually write up discussion, conclusion

NOTE: Some of the hours may subject to change depending on student need at the time. Whilst the Depth Study hours are allocated for the task, students are encouraged to work on parts of the task outside of those hours to ensure that can get the best time out of the lessons.

Structure of a Scientific Report

TITLE	A descriptive name for the investigation
BACKGROUND	~300 words on moles, molar mass, stoichiometry and displacement reactions. Includes description of issues with metals in maritime environments. Describes the metal reactivity series and provide a diagram.
AIM	A sentence that states what you are trying to achieve
HYPOTHESIS	A statement about what you think your results are going to prove
RISK ASSESSMENT	A statement outlining any safety considerations that you have considered before undertaking your research
APPARATUS	A list of all of the equipment that you will use to carry out your investigation
METHOD	A series of steps (that must be numbered) that outline what you did to achieve your results
RESULTS	Provide a balanced equation and all calculations to determine the molar mass of iron, show all working and include units.
DISCUSSION	~500 words. State if your hypothesis was correct or incorrect and why by explaining your results and what they mean. A paragraph that outlines some of the errors or problems that you may have experienced during your investigation relating to reliability, validity and accuracy. Include ideas on how you could improve your experiment to obtain better results. In this section you must discuss application of displacement reactions in metal preservation. Develop 2 testable questions that can be investigated based on the metal reactivity series and displacement reaction.
CONCLUSION	A few sentences stating whether the aim of the investigation was achieved with reasoning based on results.

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- *Exemptions and extensions for any other reason will only be determined at the discretion of the Head Teacher, and only in extenuating circumstances. You must advise the Head Teacher as soon as possible if you know you are unable to submit the task on the due date.*
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Marking Guidelines

Outcomes	Elementary	Basic	Sound	Thorough	Extensive	MARKS
CH11-1 **Questioning and predicting** develops and evaluates questions and hypotheses for scientific investigation	- Identifies an issue of metals in maritime environments - Attempts to develop an aim - attempts to identify a testable question - Attempts to propose a direction for future research	- Brief outline of issues of metals in maritime environments includes corrosion - Develops an aim which includes independent or dependent variable - Proposes a direction for future research	- Sound outline of issues of metals in maritime environments including conditions that promote corrosion, effects of corroded metal - Develops a testable aim which includes independent and dependent variable and is related to the scenario - Proposes a direction for future research related to the investigation	- Thorough outline of issues of metals in maritime environments including conditions that promote corrosion, types of metals affected, effects of corroded metal - Develops a testable aim which includes independent and dependent variable and is related to the scenario and some link to background information - Proposes concise directions for future research related to the investigation	- extensive outline of issues of metals in maritime environment including conditions that promote corrosion, types of metals affected, effects of corroded metal - Develops a testable aim which includes independent and dependent variable and is related to the scenario and supported by background information - Proposes concise directions for future research related to the investigation and supported with explanation	
	(1 mark)	*(2 marks)*	*(3 marks)*	*(4 marks)*	*(5 marks)*	
CH11-2 **Planning Investigations** designs and evaluates investigations in order to obtain primary and secondary data and information	- requires teacher assistance to collect valid and reliable secondary data and information - attempts to outline the metal reactivity series, with limited definitions and limited use of diagram - limited outline of displacement reactions - limited hypothesis includes dependent or independent variable - limited list of apparatus - limited risk assessment includes hazard, injury and prevention not completely related to the investigation - 1 number of references used - attempts to use in-text citation in a limited manner	- requires some teacher assistance to collect valid and reliable secondary data and information - sound outline of the metal reactivity series, including limited definitions and limited use of diagram - basic outline of displacement reactions - basic hypothesis includes dependent or independent variable - list of some apparatus - basic risk assessment includes hazard, injury and prevention - 2 number of references used - some evidence of in-text citation	- collects suitable valid and reliable secondary data and information with some use of the CRAAP worksheet - sound outline of the metal reactivity series, including definitions and use of diagram - sound outline of displacement reactions - relevant hypothesis includes dependent and independent variable - list of significant apparatus - sound risk assessment includes hazard, injury and prevention - 3-4 number of references used - moderate use of in-text citation in the background information and discussion	- collects suitable valid and reliable secondary data and information and makes a decision on the reliability of the source using the CRAAP worksheet for most secondary sources - thorough outline of the metal reactivity series, including definitions, explanation of the order of metals and use of diagram - thorough outline of displacement reactions including link to reactivity series and examples - relevant hypothesis includes dependent and independent variable and provides a reason based on background research - list of most apparatus - risk assessment includes relevant hazards, injuries and detailed preventions - 5-6 number of references used - use of in-text citation throughout most of the background information and discussion	- collects suitable valid and reliable secondary data and information and makes a decision on the reliability of the source using the CRAAP worksheet for all secondary sources - extensive outline of the metal reactivity series, including detailed definitions, explanation of the order of metals, relate to displacement reactions and effective use of diagram - extensive outline of displacement reactions including link to reactivity series, examples and provide an equation for the investigation - relevant hypothesis includes dependent and independent variable and provides a detailed reason based on background research - list of all correct apparatus - risk assessment includes all relevant hazards, injuries and detailed and specific preventions - >6 number of reference used - use of in-text citation extensively throughout the background information and discussion	
	(1-2 marks)	*(3-4 marks)*	*(5-6 marks)*	*(7-8 marks)*	*(9-10 marks)*	

Outcomes	Elementary	Basic	Sound	Thorough	Extensive	MARKS
CH11-3 **Conducting investigations** conducts investigations to collect valid and reliable primary and secondary data and information	- limited method with formatting issues - limited collection of qualitative or quantitative data from primary investigation not presented in the correct format	- basic method that has some logic and attempts to be in the correct format - collection of relevant qualitative or quantitative data from primary investigation that attempts to be presented in a table	- sound method that is clear and written logically in the appropriate format (numbered steps) - collection of all relevant qualitative and quantitative data from primary investigation that is presented in a table	- thorough method that is clear and written logically in the appropriate format (numbered steps) and shows reliability and validity - collection of all relevant qualitative and quantitative data from primary investigation that is clearly presented in a table with headings and units	- extensive method that is clear and written logically in the appropriate format (numbered steps) and shows reliability and validity - collection of all relevant qualitative and quantitative data from primary investigation that is clearly presented in a corrected formatted table with headings and units and includes detailed observations	
	(1-2 marks)	*(3-4 marks)*	*(5-6 marks)*	*(7-8 marks)*	*(9-10 marks)*	
CH11-7 **Communicating** communicates scientific understanding using suitable language and terminology for a specific audience or purpose	- limited explanation of results the displacement reaction to explain the observations made - limited information on how to improve - limited discussion on the applications on displacement reactions in metal preservation - limited conclusion that tries to relate to the hypothesis or the results - limited use of scientific and appropriate terminology to demonstrate familiarity with the language of the topic - limited use of a reference list - Presentation style not appropriate for audience or purpose and attempts to be in the scientific report format	- basic explanation of results the displacement reaction to explain the observations made - basic information on how to improve attempts to include reliability, validity or accuracy - basic discussion on the applications on displacement reactions in metal preservation - basic conclusion that tries to relate to the hypothesis or the results - uses basic scientific terminology with limited information - attempt of use of in-text referencing - provides a reference list attempting to use the appropriate reference style - mostly uses the scientific report format in the desired format	- sound explanation of results the displacement reaction to explain the observations made - sound information on how to improve some relevance to reliability, validity and accuracy - sound discussion on the applications on displacement reactions in metal preservation - clear, concise conclusion that relates to the hypothesis and the results - uses language that is mostly clear and relevant with accurate scientific terminology and information - use of in-text referencing that may be limited and/or have minor errors - provides a reference list using the appropriate referencing style that may be limited and/or have minor errors - uses an informative and mostly easy to read presentation in scientific report format that is mostly in the desired font, font size, word count and spacing	- thorough explanation of results the displacement reaction to explain the observations made - thorough information on how to improve includes reliability, validity and accuracy - thorough discussion on the applications on displacement reactions in metal preservation and makes a judgement related to the scenario - clear, concise conclusion that relates to the hypothesis and the results - uses language that is mostly clear and precise with accurate and relevant scientific terminology and information - correct use of in-text referencing - provides an accurate reference list using the appropriate referencing style some minor errors - uses an informative and easy to read presentation in scientific report format that is significantly in the desired font, font size, word count and spacing	- extensive explanation of the result of the displacement reaction to explain the observations made - extensive information on how to improve the investigation includes reliability, validity and accuracy - extensive discussion on the applications on displacement reactions in metal preservation and makes a judgement related to the scenario based on research - clear, concise conclusion that relates to the hypothesis, the results and the scenario - consistently uses language that is clear and precise including accurate relevant scientific terminology and information - correct use of in-text referencing - provides an accurate reference list using the appropriate Harvard referencing style - uses an eloquent, concise, informative presentation in scientific report format and is in the desired font, font size, word count and spacing	
	(1-2 marks)	*(3-4 marks)*	*(5-6 marks)*	*(7-8 marks)*	*(9-10 marks)*	

Outcomes	Elementary	Basic	Sound	Thorough	Extensive	MARKS
CH11-9 describes, applies and quantitatively analyses the mole concept and stoichiometric relationships	- Demonstrates elementary knowledge and understanding of mole, molar mass and stoichiometry - attempts to write the equation for the primary investigation - attempts to apply the mole concept to calculate the molar mass of a metal	- Demonstrates basic knowledge and understanding of mole, molar mass and stoichiometry - Correctly writes the equation for the primary investigation but errors with balancing - basic application of the mole concept to calculate the molar mass of a metal	- Demonstrates sound knowledge and understanding of mole, molar mass and stoichiometry - Correctly writes the balanced equation for the primary investigation without states - sound application of the mole concept to calculate the molar mass of a metal showing some steps in the solution	- Demonstrates thorough knowledge and understanding of mole, molar mass and stoichiometry - Correctly writes the balanced equation for the primary investigation attempts to include the correct states - thorough application of the mole concept to calculate the molar mass of a metal showing correct formula, units and the significant steps in the solution	- Demonstrates extensive knowledge and understanding of mole, molar mass and stoichiometry in the background information - Correctly writes the balanced equation for the primary investigation includes correct states - extensive application of the mole concept to calculate the molar mass of a metal showing correct formula, units and all working out	
	(1 mark)	*(2 marks)*	*(3 marks)*	*(4 marks)*	*(5 marks)*	
					TOTAL:	/40

Percentage:

Grade:

Rank:

Comments

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