



JOHN EDMONDSON HIGH SCHOOL

Assessment Notification

Faculty: Science Course: Chemistry Year: Preliminary - 11

Assessment Task: Task 2: Depth Study First Hand Investigation

Assessment Weighting: 40% Due: Term 2 Week 9 Date: 19/06/2023 – 8:25am on Canvas

Task Type: Hand in Task In Class Task Practical Task

Outcomes assessed (NESA)
CH11/12-1 CH11/12-2 CH 11/12-3 CH11/12-4 CH11/12-5 CH11/12-6 CH11/12-7 CH11-8 CH11-9 CH11-10
Task Description/Overview
<p>This is a Practical and Problem-Solving Task – including a First Han Investigation (Titration) and scientific report.</p> <p>The Sydney Desalination Plant has asked you to test the chloride content of the ocean near the sea water concentrate outlet. You are to devise a method using precipitation titration to calculate the chloride content of the water, conduct the experiment and present the findings in a Scientific Report.</p>
Detailed Assessment Task Description
<p>A Sydney Desalination Plant has asked you to test the chloride content of the ocean near the sweater concentrate outlet. You are to devise a method using precipitation titration (Mohr's Method) to determine the chloride content of the water, conduct the experiment and present the findings in a Scientific Report.</p> <p>Note: You will be provided with a standardised silver nitrate solution (0.1 mol/L)</p> <p>In class component (10 marks): You will be marked on your ability to safely conduct a titration and collect results.</p> <p>Report (70 marks): You will complete a full Scientific report on your experiment including all calculations used in the experimental part. Photos, comments, data etc. may be included.</p> <p>Include the following sections:</p> <ul style="list-style-type: none">• Title• Introduction• Aim• Hypothesis• Equipment List• Risk Assessment• Method<ul style="list-style-type: none">○ Controlled Variables• Hand drawn (or computer drawn e.g. chemix.org, labelled, scientific diagrams• Results

- Data/calculations using correct units and significant figures.
- Discussion
 - Interpretation of results
 - Accuracy, Validity and Reliability analysis
 - Key points
- Conclusion
- References

Key points to address

Address the following key points in your report. This is best done such that the questions are answered in the discussion component of the report itself, but some can be answered separately at the end of the report.

- Identify how your burette, pipette(s), volumetric flask and conical flask(s) were washed before use.
- Explain why you chose the indicator(s) that you used.
- Describe what 'end point' and 'equivalence point' mean and the difference between the two (if applicable).
- Include balanced chemical equations for all reactions with correct units and states.
- Describe the properties of a primary standard and explain why they are important.
- Explain why it is important that the chloride content of sea water, near desalination plants is closely monitored.

You have the option of using digital technologies (drop counters, conductivity probes) as part of this experiment.

Week 4B	Monday 15.5.23	Tuesday 16.5.23	Wednesday 17.5.23	Thursday 18.5.23	Friday 27.5.23	Weekend
	Receive Notification	Researching and planning at home				
Week 5A	Monday 22.5.23	Tuesday 23.5.23	Wednesday 24.5.23	Thursday 25.5.23	Friday 25.5.23	Weekend
	Double Period in Class Planning	Researching and planning at home. Writing your own Aim – Method and Results tables Risk Assessment and method checked by teacher on Friday.				
Week 6B	Monday 29.5.23	Tuesday 30.5.23	Wednesday 31.5.23	Thursday 1.6.23	Friday 2.6.23	Weekend
	Time in the laboratory conducting the experiment					
Week 7A	Monday 5.6.23	Tuesday 6.6.23	Wednesday 7.6.23	Thursday 8.6.23	Friday 9.6.23	Weekend
	Time in the laboratory conducting the experiment.					
Week 8B	Monday 12.6.23	Tuesday 13.6.23	Wednesday 14.6.23	Thursday 15.6.23	Friday 16.6.23	Weekend
	Finalising Scientific Report write up at home.					
Week 9A	Monday 19.6.23					
	Submit final report on Canvas by 8:25am					

Marking Criteria Practical Assessment

Marking Criteria – Practical Skills (Will be marked by the teacher as you are performing the firsthand investigation)				
4	3	2	1	Comment
Demonstrates an extensive ability to identify and set up the most appropriate equipment and carry out the first-hand investigation. [Link: CH11/12-2]	Demonstrates a thorough ability to identify and set up appropriate equipment and carry out the first-hand investigation. [Link: CH11/12-2]	Demonstrates a sound ability to identify and set up appropriate equipment and carry out the first-hand investigation. [Link: CH11/12-2]	Demonstrates an elementary ability to identify and set up appropriate equipment and carry out the first-hand investigation. [Link: CH11/12-2]	
	Demonstrates an extensive ability in identifying and addressing all potential hazards and chemical disposal requirements and using safe work practices during the investigation. [Link: CH11/12-3]	Demonstrates a thorough ability in identifying and addressing most potential hazards and chemical disposal requirements and using safe work practices during investigation. [Link: CH11/12-3]	Demonstrates a sound ability in identifying and addressing some potential hazards and chemical disposal requirements and using safe work practices during investigation. [Link: CH11/12-3]	
	Demonstrates an extensive ability in measuring, observing and recording results in accessible and recognisable forms, carrying out repeat trials as appropriate. [Link: CH11/12-4]	Demonstrates a thorough ability in measuring, observing and recording results in accessible and recognisable forms, carrying out repeat trials as appropriate. [Link: CH11/12-4]	Demonstrates a thorough ability in measuring, observing and recording results in accessible and recognisable forms, carrying out repeat trials as appropriate. [Link: CH11/12-4]	
Comment:				/10

Scientific Report Marking Criteria

Criteria	5	4	3	2	1
Title and Aim CH11/12-1			Clear title and aim which describes what the experiment is designed to test.	Basic title and aim which outlines what the experiment is designed to test.	Unclear Title and aim. Does not adequately describe what the experiment is designed to test. E.g. Transpiration Experiment.
Introduction CH11/12-1	Identifies and explains the nature of the problem the experiment is designed to investigate. Includes detailed, clear and relevant information. Analysis and synthesis of main ideas from literature are integrated and linked to the investigation. Justifies the hypothesis related to current facts or theories.	Identifies and explains the nature of the problem the experiment is designed to investigate. Includes clear and relevant information. Justifies hypothesis related to current facts or theories.	Identifies the nature of the problem the experiment is designed to investigate, some explanation provided. Most information is clear and relevant.	Introduction is very brief giving some background information. Minimal explanation of what the experiment is designed to investigate. Or Includes significant amounts of irrelevant information	Introduction is very brief. It does not give background information and shows limited understanding of the topic being investigated. May include irrelevant or incorrectly interpreted information.
Hypothesis CH11/12-1				Hypothesis is correctly stated. A clear statement of prediction, based on research, in regard to the chloride content of seawater.	Poorly worded hypothesis. May not have taken research into consideration.
Materials and Equipment CH11/12-2	Identifies the most appropriate equipment needed to undertake the investigation. Comprehensive list of ALL materials and equipment including sizes and quantities. Diagram is neatly drawn and accurately labelled.	Acceptable materials used. Complete list of materials and equipment may lack some information such as units and quantity. Diagram is neatly drawn with all labels.	Acceptable materials used. Complete list of materials and equipment may lack some information such as units and quantity. Diagram is neatly drawn with all labels OR labelled correctly but not drawn scientifically.	Incomplete list of materials and equipment. If included, diagram is poorly drawn e.g. without a ruler and inadequately labelled.	Incomplete list of equipment, no scientific diagram.
Risk Assessment CH11/12-2	Thorough, excellent risk assessment covering all (at least 7) necessary equipment and chemicals.	Risk Assessment sound for most (more than 5) chemicals and risks.	Risk assessment incomplete. Completed for less than 4 items.	Risk assessment incomplete. Completed for 3 or less items.	Risk assessment lists some items but does not explain or describe the precaution.

Method CH11/12-2	Appropriate method—well written & thorough. The method is written so that it could be repeated exactly by another person without prior knowledge of the experiment. Written in third person, past tense. Correct washing procedures are outlined.	Appropriate method—well written although some minor details are missing. Written in third person, past tense. Correct washing procedures are outlined.	Satisfactory method—minor details missing. May be difficult for another person to repeat without consultation. May not be written in third person, past tense.	Method is missing information. Units and or quantities may be incorrect or absent. May not be written in third person, past tense.	Method is poorly written with sections missing. Could not be accurately repeated by someone else. Written in first person.
Variables CH11/12-2	Correctly identifies at least 3 controlled variables and justifies why/how they were controlled.	Correctly identifies at least 2 controlled variables and justifies why/how they were controlled.	Correctly identifies 3 controlled variables with some justification.	Correctly identifies 3 controlled variables	Identifies 1 or 2 controlled variables.
Results CH11-9	Results are presented in well-designed tables, graphs and figures. All data is accurately recorded. All working out is shown. Correct number of significant figures is used.	Presentation of results is clear, but there are some minor omissions. Most working out is shown. Calculations are correct.	Data is complete and correctly recorded. Some omissions in working out or recording of data.	Data is displayed in a table with components missing &/or errors in calculations.	Data is poorly displayed and unorganised. Have only given raw data. Significant omissions e.g. missing units, headings, labels etc.
Results – Accuracy CH11/12-3	Concentration of chloride ion content of seawater is determined correctly (+/- 2%)	Concentration of chloride ion content of seawater is determined correctly (+/- 4%)	Concentration of chloride ion content of seawater is determined correctly (+/- 6%)	Concentration of chloride ion content of seawater is determined correctly (+/- 8%)	Concentration of chloride ion content of seawater is determined correctly (+/- 10%)
Discussion – Accuracy CH11/12-5	Outstanding analysis accuracy of the results with direct reference to research, errors that may or may not have occurred and results obtained in this experiment.	Thorough assessment of accuracy.	Sound assessment of the accuracy of the results.	Basic information about accuracy of the results.	Limited information about accuracy, not related to this investigation.
Discussion – Reliability CH11/12-3	Outstanding analysis of the reliability of the method and results. References the variables, repetition and calculation of the average titre volume.	Thorough assessment of the reliability of the method and results.	Sound information assessment of the reliability of the method and results.	Basic information about the reliability and/or validity of the method.	Limited information about the reliability of the method or results.
Discussion – Validity CH11/12-3	Outstanding analysis of validity of the results. References made to the repetition and consistency of the results collected.	Thorough analysis of the validity of the method and results. References made to the data collected.	Sound analysis of the validity of the method.	Basic information about the validity of the method.	Limited information about the validity of the method.

Discussion - Key Points CH11-9	All six key points addressed either on their own or within the report	At least five of the key points addressed correctly, either on their own or within the report	At least four of the key points addressed correctly, either on their own or within the report	At least three of the key points addressed correctly, either on their own or within the report	Only one or two of the key points addressed correctly, either on their own or within the report
Conclusion CH11/12-6				Acceptable conclusion drawn which correctly states how the hypothesis has been supported or refuted using data collected in the experiment.	Acceptable conclusion drawn which correctly states how the hypothesis has been supported or refuted.
References CH11/12-7			Provides an accurate reference list (at least 5 sources) using the APA referencing style including in text referencing.	Provides an accurate reference list (at least 4 sources) using the APA referencing style including in text referencing.	Provides an accurate reference list (at least 3 sources) using the APA referencing style including in text referencing.
Overall Presentation CH11/12-7	Report is set out neatly in a clear and logical order with headings and subheadings. Ideas are coherently expressed with correct sentence structure, grammar and spelling. Sophisticated language used. Correct scientific terminology used. Report is written in past tense, third person.	Report is clearly set out. Ideas are expressed with correct sentence structure. Use of scientific language. Minimal grammatical & spelling errors. Report is written in third person, past tense.	Report is clearly set out. Some grammatical and spelling errors. Sections of report may not be written in past tense, third person.	Report formatting is basic. Basic use of scientific language. Contains grammatical and spelling errors. May not be written in third person/past tense.	Report is poorly set out. Minimal use of scientific language. Contains multiple grammatical and spelling errors. May not be written in past tense, third person.
Comment					/70 Total: /80

Assessment Criteria		
Grade	Description	Mark Range
Outstanding (O)	The student has an extensive knowledge and understanding of the content and can readily apply this knowledge. In addition, the student has achieved a very high level of competence in the processes and skills and can apply these skills to new situations.	84.5-100%
High (H)	The student has a thorough knowledge and understanding of the content and a high level of competence in the processes and skills. In addition, the student is able to apply this knowledge and these skills to most situations.	69.5-84%
Sound (S)	The student has a sound knowledge and understanding of the content and has achieved a good level of competence in the processes and skills.	49.5- 69%
Basic (B)	The student has a basic knowledge and understanding of the content and has achieved a basic level of competence in the processes and skills	27.5-49%
Limited (L)	The student has an elementary knowledge and understanding in a few areas of the content and still requires further work to achieve competence in the processes and skills.	0-27%

Satisfactory completion of courses

A course has been satisfactorily completed, when the student has:

- Followed the course developed/endorsed by the NSW Educational Standards Authority (NESA)
- Applied himself/herself with diligence and sustained effort to the set tasks and experiences provided in the course.
- Achieved some or all of the course outcomes

Pre-lab Questions: To be answered before beginning the experiment. Will not be marked.

1. Why is a bulb pipette used when performing dilutions and not a measuring cylinder?
2. What numbers were etched on the bulb pipette? What do they mean? What does this say about the accuracy of the measurement?
3. Describe how to safely fill a burette.
4. What should the burette and pipette be washed with before use? Why?
5. Define titrant. What was the titrant in this experiment?
6. Define analyte. What was the analyte in this experiment?
7. Write the chemical equation for the reaction between silver nitrate and potassium chromate.

16. How could you reduce errors?

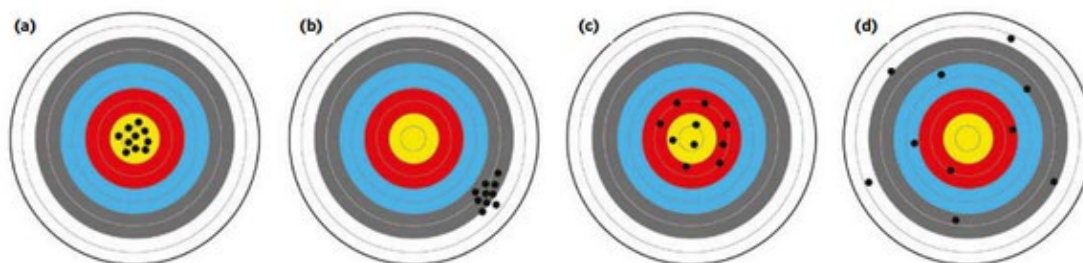


FIGURE 1.2.2 Examples of accuracy and precision: (a) both accurate and precise, (b) precise but not accurate, (c) accurate but not precise, (d) neither accurate nor precise.

17. What is precession? How can you obtain precise results? (Page 12 Pearson Chemistry 11)

18. What is accuracy? How can you obtain accurate results? (Page 12 Pearson Chemistry 11 and 12)