



St Mark's Catholic College

Depth Study

Year 11 Chemistry- Qualitative and Quantitative Chemistry.

Task 2 - 2020

TASK NAME	Depth Study			LENGTH	Part A - 500-700 words Part B - 3 A4 pages. 1000W
TASK NO	2	TASK WEIGHT	40%	TIME	
DATE ISSUED	3rd May, 2020	TERM	2	WEEK	6
DATE DUE	18th June 2020 Submit hard copy in class am.	TERM	2	WEEK	8

OUTCOMES BEING ASSESSED

CH11-1 develops and evaluates questions and hypotheses for scientific investigation

CH11-3 conducts investigations to collect valid and reliable primary and secondary data and information

CH11-5 analyses and evaluates primary and secondary data and information

CH11-6 solves scientific problems using primary and secondary data, critical thinking skills and scientific processes

CH11-7 communicates scientific understanding using suitable language and terminology for a specific audience or purpose

Knowledge and Understanding

CH11-9 describes, applies and quantitatively analyses the mole concept and stoichiometric relationships.

THE TASK

Total marks - 56 marks

Using research skills, students will prepare an information report.

Gas Laws and Scuba Diving

Introduction: By the beginning of the 19th century, the fluid behaviour of gases has been successfully described by the relationships that had been discovered between the properties of pressure, volume and temperature. Meanwhile, experiments with gases has led John Dalton to propose a modern theory of the atom. However, gas behaviour was yet to be linked to atomic theory. Italian scientist Amedeo Avogadro was able to provide this link. His work led to the universal theory of gases – Ideal Gas Law.

These discoveries have been applied to everyday situations, for example, **scuba diving**.

Scuba diving has a relationship with the ideal gas laws and the findings from scientists that have shaped the recreational sport and the understanding and operations of how it works and the effects on the human body and breathing capabilities under water.

During this depth study, you will:

1. Investigate the contributions of scientists to the Ideal Gas Law.
2. Research and review information about the relationship between the Gas Laws and scuba diving.

Part 1: Report on chosen Scientist addressing the below (20 marks)

Driving Question

How did the work of the below scientists contribute to the development of the Ideal Gas Law?

- Gay Lussac's Law
- Boyle's Law
- Charles' Law
- Avogadro's Law

Research

You are required to research your chosen scientist from above and create a report that educates your fellow peers on the contribution of your scientist to the Ideal Gas Laws. For the report, you are to answer the following questions:

1. Give a brief description of the scientist's life story.
2. Identify when in time did they discover their gas law?
3. Describe the proposed law (how does it work?) Included diagrams to illustrate your explanation.
4. Describe the experiments/investigations that the scientist conducted that contributed to the findings of their gas law and ensure that you outline the outcomes of these experiments and link to the conclusions made.
5. Identify the mathematical relationship and worked examples of the implementation of using this mathematical relationship.

The Report

The report needs to be educational for your peers and in a way that is easily understood and visually interesting. Include images, diagrams and statistics if needed.

Length of this report should not exceed 500-700 words.

Part B - Research Report on the relationship between the Gas Laws and SCUBA diving. (36 marks)

Driving question

How does the understanding of Gas Laws allow humans to explore the underwater environment?

- a. Describe the pressure and temperature of water.
- b. Describe the adverse physiological effect water submersion at depth has on the human body.
- c. Justify the equipment and management strategies used to SCUBA dive that allows divers to safely overcome pressure and temperature issues.
- d. Explain how Decompression Chamber (hyperbaric chamber) works in overcoming the negative effects of prolonged pressure conditions on the body. Give an example on where else this technology is used and assess why it is effective for the identified application (other than SCUBA).

This research should be no more than 3 A4 pages long. You are to include diagrams and images as required that further illustrate the scientific concepts

Bibliography

Students are to included an annotated bibliography for at least 5 sources that are referenced Harvard style.
Please see sample below.

Marking Criteria:

Part A Outcome	Criteria	Possible Marks	Actual Marks
1. Answering the questions. CH11/12-1	● Give a brief description of the scientist's life story	1	
	● Identify when in time did they discover their gas law?	1	
	● Described the proposed law and explain how it works. Included diagrams	4	
	● Described the experiments/investigations that the scientist conducted that contributed to the findings of their Gas Law.	3	
	● Describes and gives examples of the mathematical Relationship – includes sample Questions with worked answers.	3	
2. Explanations and applications of the Science concepts. CH11/12-7 CH11/12-9	● Thorough explanations and accurate applications of the scientific concepts are evident. Calculations included	3	
	● Good explanations and some applications of the scientific concepts are evident.	2	
	● Basic explanations or applications of the scientific concepts are evident.	1	
	● No explanations or applications of science concepts are included		
4. Appropriate use of tables, graphs, diagrams and flow charts. CH11/12-1 CH11/12-9	● Excellent use of graphics and/or diagrams that enhance the explanation of the science concept.	3	
	● Good use of graphics and diagrams that enhance the explanation of the science concept.	2	
	● Minimal use of graphics and diagrams that enhance the explanation of the science concept.	1	
	● No graphics and diagrams used in this explanation .		
6. Quality of worksheet. CH11/12-1	● A well planned report that is succinct and builds the explanation and representations of the science concepts in a logical manner. Spelling and grammar.	2	
	● Report is mostly set out in a logical format. Spelling and grammar has some errors.	1	
Comment		/20	

PART B – Research Task – Gas laws and its relationship with the underwater environment.			
Part B Outcome	Criteria	Possible Marks	Actual Marks
1. Answering the questions. CH11/12-1 CH11/12-9	<ul style="list-style-type: none"> Describe the pressure and temperature of water using a visual tool to represent data eg Table. Briefly describes pressure and temperature. 	3 1	
	<ul style="list-style-type: none"> Describe at least three adverse physiological effects of water submersion that depth has on the human body. Describe at least two adverse physiological effects that water submersion at depth has on the human body. 	4 2	
	<ul style="list-style-type: none"> Thoroughly justifies the equipment and management strategies used to SCUBA dive safely and overcome pressure and temperature issues. Gives three examples of equipment and gives reasoning linking to the Ideal Gas Laws for the use of this equipment. Includes three management strategies Explains the equipment and management strategies used for SCUBA dive safely to overcome pressure and temperature issues. Gives two examples of equipment and gives reasoning for the use of this equipment. Includes 2 management strategies Describes the equipment and management strategies used to scuba dive safely and overcome pressure and temperature issues. Gives 1-2 examples of equipment and gives reasoning for the use of this equipment. Includes 1- 2 management strategies 	8 6 4-1	
	<ul style="list-style-type: none"> Thoroughly explain how the Decompression Chamber works in overcoming the negative effects of prolonged pressure conditions on the body. Including a procedure for its use. Gives a sound explain of how Decompression Chamber works in overcoming the negative effects of prolonged pressure conditions on the body. Include procedure of how they work. Briefly describes Decompression Chamber and how they help the human body 	4 2 1	
Alternate use of decompression chamber CH11/12-9	<p>Identifies a valid alternate example of the use of the Decompression Chamber and assesses its use based on the circumstance in which it is used and relates this to the environment and the activity undertaken there by a human being.</p> <p>Identifies a valid alternate example of the use of the Decompression Chamber and explains its use based on the circumstance where it is used and relates this to the environment and the activity undertaken there by a human being.</p>	6 4	

	Identifies a valid alternate example of the use of the Decompression Chamber and outlines its use based on the circumstance where it is used.	2	
2. Explanations and applications of the Science concepts. CH11/12-7 CH11/12-9	<ul style="list-style-type: none"> ● Thorough explanations and accurate applications of the scientific concepts are evident throughout answers. ● Good explanations and some applications of the scientific concepts are evident. ● Basic explanations or applications of the scientific concepts are evident. ● No explanations or applications of science concepts are included 	3 2 1	
4. Appropriate use of tables, graphs, diagrams and flow charts. CH11/12-7 CH11/12-9	<ul style="list-style-type: none"> ● Excellent use of graphics and diagrams that enhance the report of the science content. ● Good use of graphics and diagrams that enhance the presentation of the science content. ● Minimal use of graphics and diagrams that enhance the presentation of the science content. ● No graphics and diagrams used in this presentation. 	3 2 1 0	
5. Bibliography CH11/12-7 <i>See example below</i>	<ul style="list-style-type: none"> ● An annotated bibliography with 5 reliable references to internet sites, periodicals and/or books. Referenced Harvard style. The validity of each resource has been identified and explained. ● A good bibliography that refers to two areas of reference. ● A minimal bibliography and referencing of the project. ● No bibliography or referencing. 	5 3 1 0	
Comment		/36	
Overall Feedback		/56	

Harvard style of referencing for at least three different types of sources.

Example:

(1) Trevor, C.O., Lansford, B. and Black, J.W., 2004, 'Employee turnover and job performance: monitoring the influences of salary growth and promotion', *Journal of Armchair Psychology*, vol 113, no.1, pp. 56-64.

(2.) In this article Trevor et al. review the influences of pay and job opportunities in respect to job performance, turnover rates and employee motivation. (3) The article is useful to my research topic, as Trevor et al. suggest that there are numerous reasons for employee turnover and variances in employee motivation and performance. (4) The main limitation of the article is that the survey sample was restricted to mid-level management, (5) thus the authors indicate that further, more extensive, research needs to be undertaken to develop a more in-depth understanding of employee turnover and job performance. (6) This article will not form the basis of my research; however it will be useful supplementary information for my research on pay structures. (7) This article's reliability is high due to the fact that it is published in a respected journal and referred to in many other studies. (8) This resource is valid to my research as it related to the research topic

Key – (1) Citation (2) Introduction (3) Usefulness (to your research/ to a particular topic) (4) Limitations (5) Conclusions (6) Reflection (explain how this work illuminates your topic or how it will fit in with your research) (7) Reliability (8) Validity

Report Comment

A	Demonstrates an extensive knowledge and understanding of the concepts covered in the task. Displays an outstanding ability to describe and apply chemistry concepts, clearly and accurately, and is able to apply the concepts to a given scenario. Critically analyses information and poses questions to help solve problems and make inferences. Communicates succinctly, logically and sequentially using a variety of scientific formats and conventions.
B	Demonstrates a thorough knowledge and understanding of the concepts covered in the task. Thoroughly describes and applies chemistry concepts, clearly and accurately, and is able to apply the concepts to a given scenario. Analyses information and poses some questions to help solve problems and make inferences. Communicates succinctly, logically and sequentially using a variety of scientific formats and conventions.
C	Demonstrates a sound knowledge and understanding of the concepts covered in the task. Describes chemistry concepts clearly and accurately, and is able to apply the concepts to a given scenario. Poses some questions to help solve problems and make inferences. Communicates proficiently using a variety of scientific formats.
D	Demonstrates a basic knowledge and understanding of the concepts covered in the task. Uses simple chemistry definitions, terms, diagrams to communicate understanding of chemistry concepts. Selects some relevant data from information given. Communicates using some scientific formats.
E	Demonstrates a limited knowledge and understanding of the concepts covered in the task. Recalls elementary terminology and formulae related to some areas of chemistry. Attempts to identify relevant data from information given in written or tabular form. Attempts to

	communicate using some scientific formats.
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