JOHN EDMONDSON HIGH SCHOOL
Assessment Notification

Faculty: Science ScienceCourse: ChemistryYear: 11 Preliminary

Assessment Task: Bonding – Modelling and Research Task

Assessment Weighting: 30% Due: Term 1 Week 9B Date: 28/3/2023

Task Type: Hand in Task ☒ In Class Task ☒ Practical Task ☐

Outcomes assessed (NESA)
A student: CH11/12-4 - selects and processes appropriate qualitative and quantitative data and information using a range of appropriate media CH11/12-5 - analyses and evaluates primary and secondary data and information CH11/12-6 - solves scientific problems using primary and secondary data, critical thinking skills and scientific processes CH11/12-7 - communicates scientific understanding using suitable language and terminology for a specific audience or purpose CH11-8 - explores the properties and trends in the physical, structural and chemical aspects of matter
Task Description/Overview
This task requires you to apply your knowledge learnt about ionic and covalent bonding and compounds to real life situations of molecules that are formed from either ionic or covalent bonding. Students will apply their understanding and present it as physical models and written responses during an in-class task. You will be assessed on your ability to: • Investigate the chemical structures of elements and compounds, including ionic networks, covalent networks (e.g. diamond and silicon dioxide) and polar and non-polar covalent molecular compounds. • Model, compare and contrast ionic and covalent bonds and compounds • Model, compare and contrast polar and non-polar molecules • Explore and model the similarities and differences between the nature of intermolecular and intramolecular bonds • Assess and evaluate sources of information • Complete research and answer questions in class about different chemical structures, the differences between ionic and covalent compounds and the role of electronegativity in determining the nature of the bonds between atoms.

Syllabus Content to be covered as part of the research:

Periodicity
Inquiry question: Are there patterns in the properties of elements?
Students:
● demonstrate, explain and predict the relationships in the observable trends in the physical and chemical properties of elements in periods and groups in the periodic table, including but not limited to:
– state of matter at room temperature
– electronic configurations and atomic radii
– first ionisation energy and electronegativity
– reactivity with water

Bonding Inquiry question:
What binds atoms together in elements and compounds?
Students:
● investigate the role of electronegativity in determining the ionic or covalent nature of bonds between atoms
● investigate the differences between ionic and covalent compounds through:
– using nomenclature, valency and chemical formulae (including Lewis dot diagrams) (ACSCH029)
– examining the spectrum of bonds between atoms with varying degrees of polarity with respect to their constituent elements' positions on the periodic table
– modelling the shapes of molecular substances (ACSCH056, ACSCH057)
● investigate elements that possess the physical property of allotropy
● investigate the different chemical structures of atoms and elements, including but not limited to:
– ionic networks
– covalent networks (including diamond and silicon dioxide)
– covalent molecular
– metallic structure
● explore the similarities and differences between the nature of intermolecular and intramolecular bonds and the strength of the forces associated with each, in order to explain the:
– physical properties of elements
– physical properties of compounds (ACSCH020, ACSCH055, ACSCH058)

Detailed Assessment Task Description

Part 1: Research Task and Model Construction (20 marks).

You need to research the various types of bonding that occurs in chemistry and construct models to demonstrate the following EIGHT things:

- Ionic networks
- Covalent networks
- Ionic bonds
- Covalent bonds
- Polar substances
- Non-polar substances
- Dipole-Dipole Forces and
- Hydrogen Bonding

The models must include appropriate labels including the use of nomenclature, valency, polarity and chemical formula (including Lewis dot diagrams), where appropriate.

Together, the models must fit into a space the size of two, A3 sheets of paper (or 4, A4). Models should contain both 2D and 3D Elements. An individual model can represent more than one of the eight aforementioned structures (e.g., a model of an ionic networks can be used to model ionic bonding, two individual models are not necessary).

TO BE SUBMITTED BEFORE ROLL CALL (8:25am) ON 28th March, Thursday

Part 2: Bibliography and Secondary Source Analysis (15 marks).

You need to include a correctly formatted bibliography, with AT LEAST five sources.

You need to assess the relevance, accuracy, validity and reliability of two of the secondary sources.

TO BE SUBMITTED BEFORE ROLL CALL (8:25am) ON 28th March, Thursday

Part 3: In class written component (40 marks).
It will consist of Multiple-choice questions and short/extended response questions.
During class time (Period 1 and 2 on March 28th 2024), you will be required to complete questions based on your research and your models. You can bring with you ONE, double sided A4 page of handwritten notes (including diagrams) covering the syllabus content outlined in this notification.

This ONE double sided page research will not be marked.

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

Model marking Criteria.

Criteria	(16-20)	(11-15)	(6-10)	(0-5)
BONDING	Accurate, well-constructed models, of ionic networks, covalent networks and covalent molecular substance that demonstrate both polar and non-polar substances and Dipole-Dipole Forces OR Hydrogen Bonding.	Some (6-7) accurate models of ionic networks, covalent networks and covalent molecular substance that demonstrate both polar and non-polar substances and Dipole-Dipole Forces OR Hydrogen Bonding.	Some (3-5) accurate models.	SOME (1-2) accurate models.
LABELLING	Accurate Labels on ALL EIGHT of the models (types of compounds and bonding) including the use of correct nomenclature, valency and chemical formula where appropriate	Accurate Labels on MOST (5) of the models including the use of correct nomenclature, valency and chemical formula where appropriate.	Accurate Labels on MOST (3-4) of the models including the use of correct nomenclature, valency and chemical formula where appropriate.	Accurate Labels on SOME of the models including the use of correct nomenclature, valency and chemical formula where appropriate.
ELECTRON ARRANGEMENT	Arrangement of electrons in each of these models clearly defined.	Arrangement of electrons in MOST (5) of these models clearly defined.	Arrangement of electrons in SOME of these models identified.	Arrangement of electrons identified in some but not all models.
DIMENSIONS of the model 2D /3D	Include 2D and 3D elements as part of the model.	Include 2D and 3D elements as part of the model.	Include 2D and 3D elements as part of the models.	Include 2D and 3D elements as part of the model.
MODEL SIZE	Does not exceed the size (2 A3 or 4 A4 pages).	Does not exceed the size (2 A3 or 4 A4 pages) / incorrect Size.	Does not exceed the size (2 A3 or 4 A4 pages)/ incorrect Size.	Does not exceed the size (2 A3 or 4 A4 pages) / incorrect Size.

Referencing Marking Criteria

Part 2: Bibliography	**Analyses and evaluates primary and secondary data and information CH11/12-5**
Marks (5)	Bibliography includes at least FIVE resources, correctly formatted and referenced, including in alphabetical order. **One mark: Correct alphabetical order** **Four Marks: at least 5 correctly formatted and referenced**

Part 3: Source Analysis	
Marks (10)	TWO resources evaluated for reliability and validity using all five aspects of the CRAAP test.
Marks (6-9)	Two resources evaluated for reliability and validity using some aspects of the CRAAP test.
Marks (4-5)	One resource evaluated reliability and validity using all five aspects of the CRAAP test.
Marks (0-4)	One resource evaluated for reliability or validity with the use of some aspects of the CRAAP test.