Higher Chemistry: Unit 1 – Chemical Changes and Structure

Part B – Properties of Bonding (Lessons 10 - 11)

SUMMARY, QUIZ and HOMEWORK 3

WELL DONE!

By now you should have completed the following lessons:

10. Properties of substances: Melting and Boiling Point

11. Properties of substances: Solubility and Viscosity

Now it's time for a summary of what you have learned so far and to check your understanding.

Success Criteria

You will have been successful in this lesson if you:

1. Read the summaries below (there is no need to copy/print these)
2. Watch the links provided (optional)
3. Complete the summary quiz (on MS forms)
4. Completed Homework 1 (answers will be given next week)

MS Teams will be monitored throughout the week by a chemistry teacher. If you need help or clarification with either the task or the content of the lesson, just ask.

Links to Prior Knowledge

You may wish to revise the following to help you understand this summary:

- Higher Chemistry – Lessons 10 – 11

You will need a data booklet for this lesson. Download or print a copy of the Higher Chemistry Data Booklet from MS Teams or from the SQA website
- https://www.sqa.org.uk/sqa/files_ccc/ChemistryDataBooklet_NewH_AH-Sep2016.pdf

SUMMARY

YOUTUBE SUMMARY VIDEOS

There are vast number of online resources to learn about chemical bonding. Unfortunately, depending on the level of qualification you are study and the country you are learning chemistry in, the definitions can sometimes sound different. Always refer back to your notes to check the correct terminology. If you are unsure, as a teacher.

These clips are optional, but may help you gain a greater understanding of the topic we have been learning about.

WATCH – YouTube: Ted Ed: https://youtu.be/ASLUY2U1M-8

(3:51 mins long)

This is a really great summary of the properties of water, polarity and hydrogen bonding.

WATCH – Miss Adam's Chemistry: https://youtu.be/Uh1-H9y7ObQ

NOTE – 6:45 mins long. Summary of melting and boiling points, solubility and viscosity. Also includes a demonstration of viscosity.

Further Reading

To learn more about this topic. Follow the links below:

BBC Bitesize: https://www.bbc.co.uk/bitesize/guides/zt9887h

Read pages 1 to 10 and try the TEST

Evans2 chem web: https://www.evans2chemweb.co.uk/login/index.php#

Username: snhs password: giffnock

Select any teacher → revision material → CfE Higher → Bonding and Structure

Summary Quiz and Homework 3

You should now completed the **Summary Quiz by Friday** the 19th June.

You will need to be signed into GLOW to access this link:

https://forms.office.com/Pages/ResponsePage.aspx?id=oyzTzM4Wj0KVQTctawUZKSkMeY-rsvRNs_x4XAdH73JURUtIMFA4VzZEQ00wU05BTENIOElCUDg1Ny4u

You should also now be able to complete **Homework 3** (below)

Please Note: This homework contains your first "using your knowledge of chemistry" question at higher level. You may find this tricky, but persevere! Some good advice is try to make sure there is plenty of higher chemistry information, you will not be given credit for work that you covered in Nat 5. Use what you've learned in the last few lessons.

COMPLETE THIS BY FRIDAY 19th June. You do not need to submit this work. Keep your answers in a jotter and you can mark this yourself with answers next week.

Homework 3 – Types of Bonding

1. Which type of bonding is never found in elements?

A Metallic
B London dispersion forces
C Polar covalent
D Non-polar covalent

2. Which of the following chlorides is most likely to be soluble in tetrachloromethane, CCl_4?

A Barium chloride
B Caesium chloride
C Calcium chloride
D Phosphorus chloride

3. Element X was found to have the following properties.

(i) It does not conduct electricity when solid.
(ii) It forms a gaseous oxide.
(iii) It is a solid at room temperature.

Element X could be

A magnesium
B silicon
C nitrogen
D sulfur.

4. An element (melting point above 3000°C) forms an oxide which is a gas at room temperature. Which type of bonding is likely to be present in the element?

A Metallic
B Polar covalent
C Non polar covalent
D Ionic

5. At room temperature, a solid substance was shown to have a lattice consisting of positively charged ions and delocalised outer electrons. The substance could be:

A Graphite
B Sodium
C Mercury
D Phosphorus

6. Which property of a chloride would prove that it contained ionic bonding?

A It conducts electricity when molten.
B It is soluble in a polar solvent.
C It is a solid at room temperature.
D It has a high boiling point.

7. Which of the following does not contain covalent bonds?

A Hydrogen gas
B Helium gas
C Nitrogen gas
D Solid sulfur

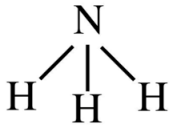
8. Which of the following structures is never found in compounds?

A Ionic
B Monatomic
C Covalent network
D Covalent molecular

9. Which line in the table represents the solid in which only London dispersion forces are overcome when the substance melts?

	Melting Point / °C	Electrical conduction in solid state
A	714	non-conductor
B	98	conductor
C	660	conductor
D	44	non-conductor

10. Compared to other gases made up of molecules of similar molecular masses, ammonia has a relatively high boiling point.



(a) What type of Van der Waals forces causes ammonia to have such a high boiling point? **(1)**

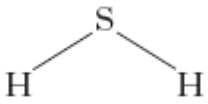
(b) How does this type of intermolecular bonding arise in ammonia? **(1)**

11. Chlorine and argon are beside one another on the periodic table and are both gases at room temperature.

(a) Find the boiling point of chlorine and argon. **(1)**

(b) Explain fully, in terms of structure and the type of van der Waals forces present, why the boiling point of chlorine is higher than that of argon. **(3)**

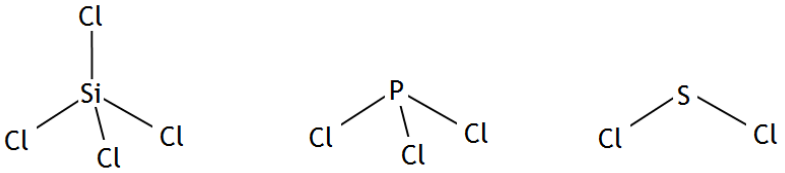
12. Hydrogen sulfide has a boiling point of −60 °C.



(a) What type of Van der Waals forces causes hydrogen sulfide to have a higher boiling point than chlorine. **(1)**

(b) How does this type of intermolecular bonding arise in hydrogen sulphide. **(1)**

13. The structures of three chlorides are shown. Maryam investigated the solubility of the compounds in hexane and in water.



Using your knowledge of chemistry, comment on the solubility of these chlorides in water and in hexane. **(3)**

Total = 20

Answers will be given next week