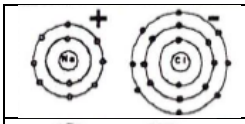
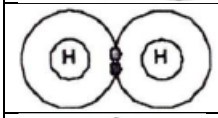
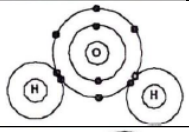
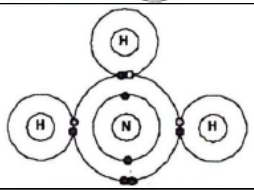
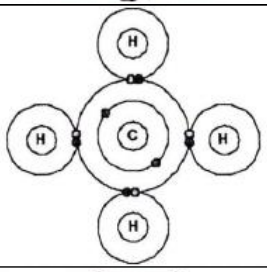
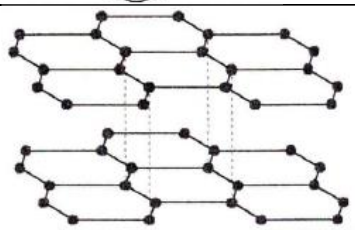
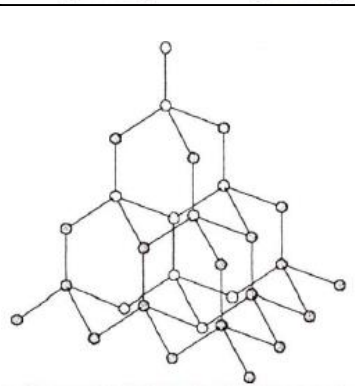
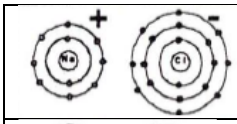
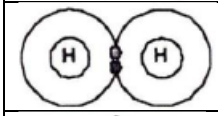
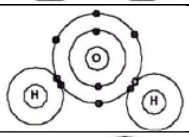
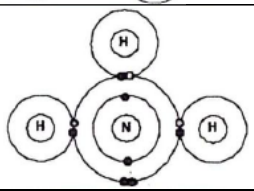
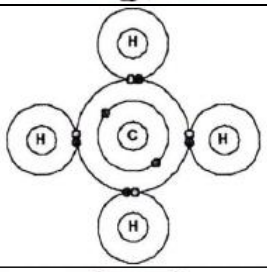
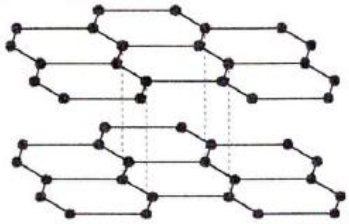
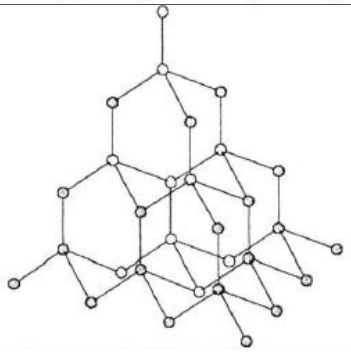
Metallic substances - Nature & properties

Worksheet

- ***Complete the 'Summary table 1' worksheet (I gave you this last lesson but I have included a copy below for those who weren't present or have lost it!)***
- ***Green pen mark using the mark scheme below.***

	Name	Bonding	Type of structure
			
			
			
			
			
			
			

Mark Scheme

	Name	Bonding	Type of structure
	**Sodium chloride**	**Ionic**	**Giant Ionic Lattice**
	**Hydrogen**	**Covalent**	**Simple Molecule**
	**Water**	**Covalent**	**Simple Molecule**
	**Ammonia**	**Covalent**	**Simple Molecule**
	**Methane**	**Covalent**	**Simple Molecule**
	**Graphite**	**Covalent**	**Giant Covalent**
	**Diamond**	**Covalent**	**Giant Covalent**

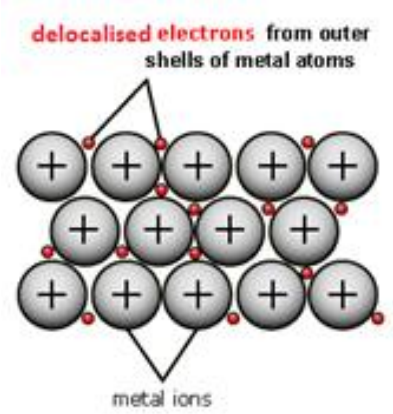
Reading

- ***CGP 'GCSE AQA Chemistry' textbook – Read pages 92-93 and page 285***

Notes

- **Copy the notes below into your exercise book.**

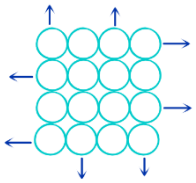
Metallic substances – Nature & Properties



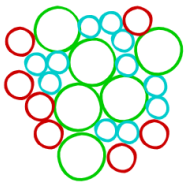
Metallic Bonding is the strong electrostatic attraction between positive metal ions and a sea of delocalised electrons.

Metals form giant metallic structures

Properties



- Malleable, soft and ductile - ordered layers of metal ions can slide over each other.
- Electrical conductors – delocalised electrons are free to move and carry a charge.
- Heat conductors – Delocalised electrons moving throughout the structure can transfer energy through it.
- High melting point – a lot of energy is needed to overcome the strong electrostatic forces of attraction (solid at room temperature).
- High density – has a tightly packed lattice structure



Alloys are harder than pure metals because it is made up of different sizes of atoms and the layers are too distorted to slide over each other.

Textbook work

- ***Write down any additional notes from pages 92-93 and page 285***
- ***Answer all questions on page 93***
- ***Questions 1 and 2 on page 286***
- ***Green pen mark the answers (find the answers on page 339 and page 360)***

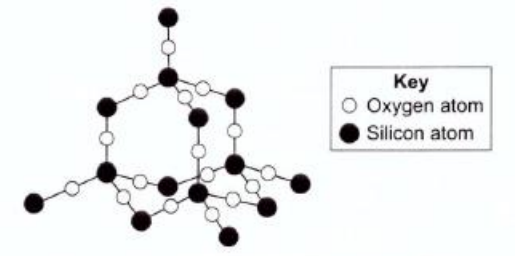
Worksheets

- ***Complete the 'Welding blankets - exam question' worksheet (I gave you this last lesson but I have included a copy below for those who weren't present or have lost it!) We will mark this when I see you next lesson.***

- ***Complete the 'Summary table 2' worksheet (I gave you this last lesson but I have included a copy below for those who weren't present or have lost it!) – there is no mark scheme for this as it is designed to be revision for you to go through your notes for all of the bonding so far.***

Exam Question – Welding blankets

1. Welding blankets are placed under metals being welded. They protect the area under the welding.
   Some welding blankets are made from silicon dioxide which does not melt when hit by sparks or molten metal.
   The diagram shows a small part of the structure of silicon dioxide.



   a. Describe the structure and bonding in silicon dioxide and explain why it is a suitable material for making welding blankets.

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   (3 marks)

   b. The picture shows a wooden bowl. The pieces of wood used for this bowl were dyed different colours.

   The artist who made the bowl explained why he dissolved the coloured dyes in methanol.

I use different coloured dyes dissolved in methanol. I use methanol because with dyes dissolved in water the wood needs to be soaked for a longer time. The bowl dries more quickly if I use methanol instead of water.

i. Why is using methanol an advantage to the artist?

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(1 mark)

ii. The bonds within a methanol molecule are strong, covalent bonds. Explain why methanol has a low boiling point.

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(2 marks)

2. Copper is used because it is a very good conductor of electricity. Copper is a typical metal.
   a. Describe the structure and bonding in a metal. You may wish to draw a diagram to help you to answer this question.

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(3 marks)

   b. Explain, by reference to your answer to part (a), why copper conducts electricity.

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(1 mark)

   c. Explain, by reference to your answer to part (a), why copper can be drawn into wires.

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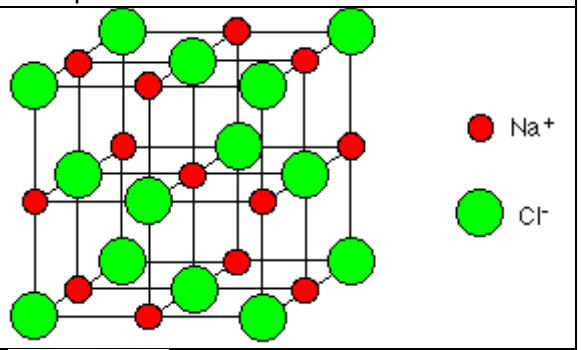
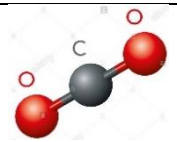
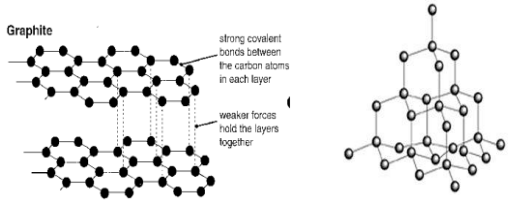
(1 mark)

Summary of Types of bonding and structures

Type of Bonding	Description of bonding	Structure	Key Properties	Example
Ionic				
Covalent				
				
Metallic