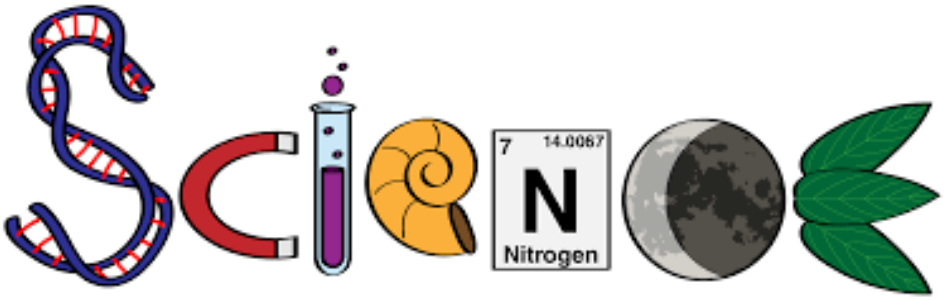
Meopham School



HOMEWORK BOOKLET

C2

Homework 1

States of Matter

1) Complete the table to show the properties of solids, liquids and gases:

	Can it flow?	Can it be compressed (squashed)?	Does it have a fixed volume?	Does it have a fixed shape?	How do the particles move?	Can it diffuse?	Draw the arrangement of particles.
solids							
liquids							
gases							

2) Match up the keyword to the correct definition:

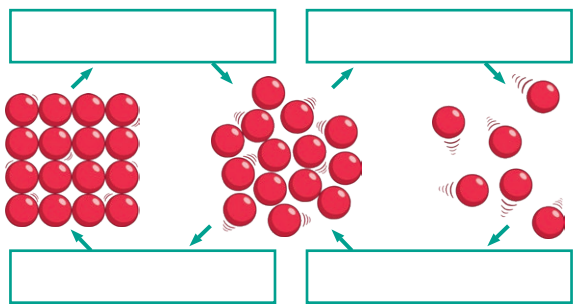
boiling	A solid changing into a liquid as the intermolecular forces are overcome by the input of thermal (heat) energy.
melting	A liquid changing into a solid as the particles move closer together.
freezing	A liquid changing into a gas as the intermolecular forces are overcome by the input of thermal (heat) energy.
condensing	A gas changing into a liquid as the particles move closer together.

3) Which two states of matter above are involved in a substance's...

a. melting point? _____ _____

b. boiling point? _____ _____

4) Now use the keywords from question 2 to label the changes of state in the picture below.
Challenge: can you add arrows and labels for the two new changes of state keywords?



Homework 1

Ionic Compounds Keywords

1. Complete the gaps in each sentence. You can use the word bank below, or cover it up for an extra challenge!

   a. Ionic compounds have a _____ arrangement of ions. The ions alternate between positively charged _____ ions and negatively charged _____ ions. The pattern repeats and creates a large _____ structure.

   b. Ionic compounds have _____ melting points. This is because of the many _____ bonds between the ions. It takes a _____ of energy to overcome this attraction. This is also true for the _____ point.

   c. When solid, an ionic compound _____ carry an electric current. This is because the ions are _____ in place.

   d. When dissolved or molten (melted), an ionic compound _____ carry an electric current. This is because the ions are _____ to move.

Word bank: Read carefully! You might not need all of the words

lot, little, free, high, low, regular, metal, positively, strong, boiling, irregular, can, non-metal, cannot, fixed, negatively, lattice, weak.

Score: /12

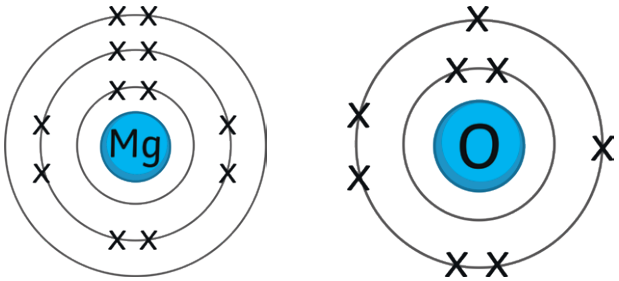
2. Draw a diagram to show the arrangement of ions in sodium chloride (salt).

   Try to label all of these words on your picture: positive, negative, metal, non-metal, electrostatic forces, lattice, sodium, chloride, anion and cation.

Homework 1

Ionic Compounds Exam Style Question

1. The diagram shows the electronic configuration of magnesium and oxygen.



a. Describe what will happen when these two elements react, in terms of electrons.

b. Describe the structure of an ionic compound.

c. Explain why an ionic compound can conduct electricity when dissolved in water or molten, but not when solid.

d. The table shows four compounds. Decide which ones are ionic by placing a tick next to them.

Compound	Melting Point (°C)	Boiling Point (°C)	Can Carry an Electric Charge?	Ionic Compound or Not? ✓×
A	-114.1	78.0	Almost none.	
B	845.0	1 676	When dissolved in water, or molten.	
C	645	1 297	When dissolved in water, or molten.	
D	146	Decomposes before boiling.	no	

Homework 2

Covalent Bonding - Properties of Simple Molecules

1. Look at the properties of each simple molecule in the data table below:

Simple Molecule	State of Matter at Room Temperature	Melting Point (°C)	Boiling Point (°C)	Can Conduct Electricity?
fluorine	gas	-219.67	-188.11	no
bromine	liquid	-7.20	58.80	no
iodine	solid	113.70	184.40	no
water				no
carbon dioxide	gas	-56.60	-78.50 (sublimes)	no
methane	gas	-182.50	-161.50	no

a. Complete the missing data for water.

b. Which state of matter is the most common for simple molecules? _____

c. State the range of melting points. _____ to _____

d. What do you notice about the melting points?

_____

_____

e. What do you notice about the boiling points?

_____

_____

f. Which simple molecule doesn't fit the pattern? _____

g. Look at the location of this anomaly on the periodic table. Can you suggest why this doesn't fit the pattern?

_____

_____

h. Why do you think **none** of these simple molecules can conduct electricity? (Clue: Think back to ionic compounds dissolving in water.)

_____

_____

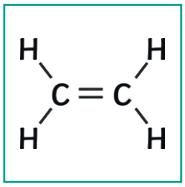
Homework 2

Polymers Exam Style Questions

1. Complete the missing parts of the sentence.

   Polymers are _____ molecules made up of smaller, repeating units. Each smaller individual molecule is called a _____ and they join together in a process called _____.

2. Which of these diagrams represents a polymer? Tick all that apply.



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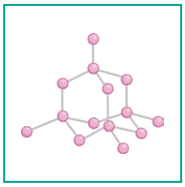
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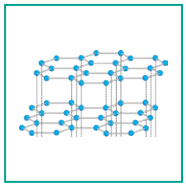
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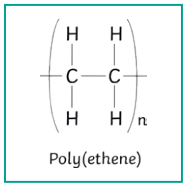

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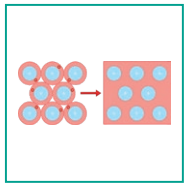
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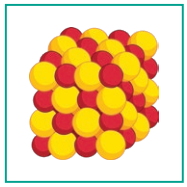
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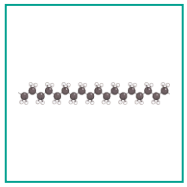
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3. a. Which state of matter are most polymers at room temperature?

   _____

   b. Explain your answer.

   _____

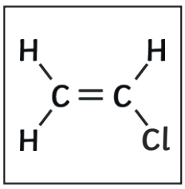
   _____

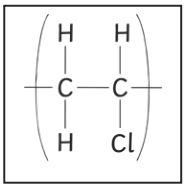
   _____

4. State the type of bonds found between the atoms within a polymer.

   _____

5. Here is a diagram of chloroethene.





   a. Explain why chloroethene can become the polymer poly(chloroethene).

   _____

   _____

   b. What is incorrect in this diagram of a repeating unit?

   _____

   _____

Self-Assessment

Colour in the stars to show how confident you are:

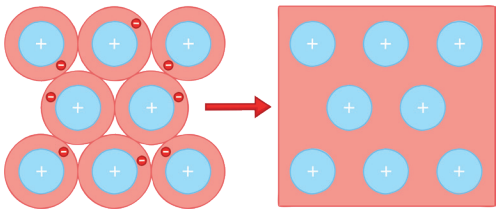
Before Marking: ☆ ☆ ☆ ☆ ☆

After Marking and Intervention: ☆ ☆ ☆ ☆ ☆

Homework 3

Metallic Bonding

1. Label both pictures with as much detail as you can.



2. Complete the following sentences:

   The metal ions have a _____ charge.

   The electrons have a _____ charge.

   The electrons in the _____ shell of the metal atoms are _____ (free).

   There is a strong force of attraction between the metal ions and the delocalised _____ because opposite charges attract. This creates a large, regular pattern called a _____.

3. For each of the following properties of metals, write an explanation for them.

   a. High melting and boiling point.

   b. Can conduct electricity and thermal energy (heat).

   c. Malleable and ductile.

Homework 4

Allotropes of Carbon Summary

1. Complete each sentence to summarise your research.

   a. Carbon can exist in many forms called _____, from the Greek for 'other forms'.

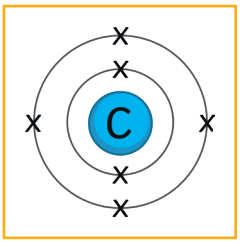
   b. Carbon is a non-metal, so will form _____ bonds with other atoms of this element.

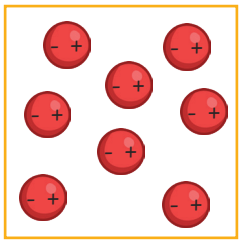
   c. Most giant structures of carbon have _____ melting and _____ points.

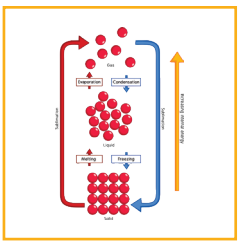
   d. **Some** giant carbon structures can conduct electricity, this is because there are _____ electrons.

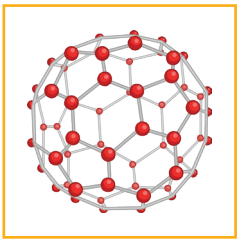
   e. Fullerenes are carbon structures, but can be different shapes, such as hollow _____ or cylinders known as nanotubes.

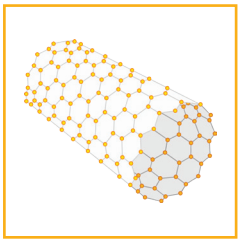
2. Match each picture clue to each sentence above. Write the letter of the sentence you think it matches up to.

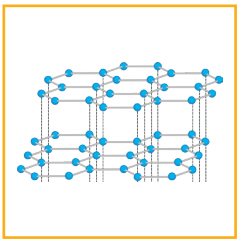


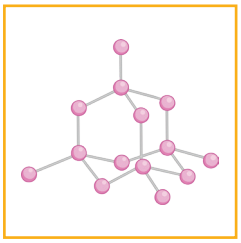












Homework 4

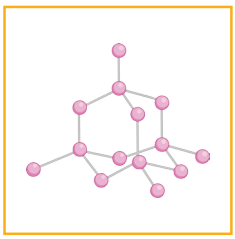
Allotropes of Carbon Exam Style Questions

1. Connect the properties of allotropes of carbon to their explanations using lines.

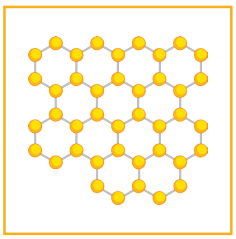
Property	Explanation
a. High melting point.	1. One electron from each carbon atom is free (delocalised).
b. **Some** are able to conduct electricity.	2. **Some** have weak intermolecular forces between layers.
c. **Some** have layers which can slide over one another.	3. Strong covalent bonds require a lot of energy to break.

2. Which allotrope is being described above? _____

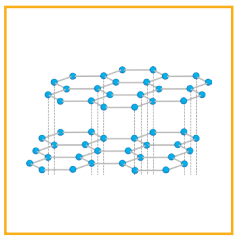
3. Name each of the allotropes of carbon, A to E, from looking at the pictures below.



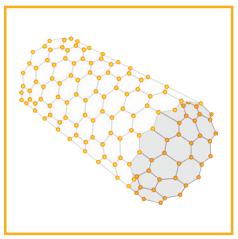
Allotrope A is _____



Allotrope B is _____



Allotrope C is _____



Allotrope D is _____

4. Which of these are giant covalent structures? Tick all that apply.

- silicon dioxide (silica) ☐
- graphite ☐
- graphene ☐
- Buckminsterfullerene ☐
- diamond ☐
- nanotubes ☐

Self-Assessment

Colour in the stars to show how confident you are:

Before Marking: ☆ ☆ ☆ ☆ ☆

After Marking and Intervention: ☆ ☆ ☆ ☆ ☆